ISSN 1397-4211

NR. 4, 6. årgang, NOVEMBER 2002

DANSK SPORTSMEDICIN

IDRÆTSMEDICIN OG TUNG STYRKETRÆNING

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ABSTRACTS TIL 6th SCANDINAVIAN CONGRESS ON MEDICINE AND SCIENCE IN SPORTS

DANSK IDRÆTSMEDICINSK SELSKAB

fagforum for idrætsfysioterapi

Redaktionelt

Arne Gam
Redaktør

Regnen siler stille ned og solen er ikke til at se. Det gode sommervejr er forbi. Nu følger en lang periode med mørke og kun få lyspunkter. Hvad kan bringe mere fornøjelse i denne mørke tid end 4 dage i Århus fra den 21. til den 24. november, hvor den sjette Skandinaviske Kongres løber af stablen?

Dette nummer vil indholdsmæssigt fokusere på abstrakter fra kongressen. Skaren af emner er broget og afspejler den brede forskning som foregår i relation til idrætsmedicin. Selv om træning af kronisk bronchitis med styrketræning måske umiddelbart kan ligge langt fra idrætsmedicin - og dog!

Ikke overraskende fylder ACL-studierne en hel del. De anførte data angiver en overraskende stor spredning i langtidsresultaterne. En spredning som genfindes i studierne af Bankart-læsioner.I tråd med tidens store interesse er der mange abstrakter som berører seneadaptation, fysiologiske aspekter om heling og styrkelse af sener, såvel som behandlingsmodaliteter. I mange år har det været en klinisk erfaring, at smerter fra sener øger spændingen i muskulaturen. I et skulderstudie får vi nu også dokumentation for det. Dertil kommer kongressens mange spændende symposier om forskellige varme, idrætsmedicinske emner. Så det er bare med at tilmelde sig til kongressen, læse abstrakterne og så komme til Århus og få dem uddybet!

Muskeltræning er ofte forvirrende, fordi mange faktorer spiller ind. Kan vi med vores nuværende forskning påpege den mest hensigtsmæssige træning i en given situation? Thomas Bandholm gør i artiklen "Idrætsmedicin og tung styrketræning" rede for aktuelle forskningsresultater om styrketræning og sin mening om hvordan den kan anvendes i dagligdagen, når der skal rådgives om træning og rehabilitering.

Hvis det faglige indhold ikke er nok til at friste, bør man tænke på det sociale samvær i Århus. Så er der vist ikke flere argumenter mod ikke at tage til den sjette Skandinaviske Kongres!

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DANSK SPORTSMEDICIN er et tidsskrift for Dansk Idrætsmedicinsk selskab og Fagforum for Idrætsfysioterapi. Indholdet er tværfagligt klinisk domineret. Tidsskriftet skal kunne stimulere debat og diskussion af faglige og organisationsmæssige forhold. Dermed kan tidsskriftet være med til at påvirke udviklingen af idrætsmedicinen i Danmark.

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Andre kan tegne årsabonnement for 250 kr. incl. moms.

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Redaktion
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Priser for annoncering
Oplyses ved henvendelse til redaktionssekretæren.

Tryk og Layout
Tryk: EJ Offset AS, Beder
DTP: Gorm H. Rasmussen

Dansk Sportsmedicin udgives med støtte fra Kulturministeriet.

Indhold:

fagforum for idrætsfysioterapi

Deadlines for kommende numre:

Nummer	Udkommer	Artikelstof	Annoncer
1/2003	ca. 15. februar	1. januar	15. januar
2/2003	ca. 15. maj	1. april	15. april
3/2003	ca. 15. august	15. juni	15. juli
4/2003	ca. 15. november	1. oktober	15. oktober

Venlig hilsen Redaktionen

Dansk Idrætsmedicinsk Selskab

v/ Klaus Bak, formand

Danmark fattes idrætslæger…!

Ja, det stod der i overskriften. Kun 46 ud af selskabets mange medlemmer har ansøgt om at få diplomanerkendelse i idrætsmedicin. Fristen var 1. april 2002. Der er med sikkerhed flere potentielle ansøgere blandt medlemmerne, og derfor er der i dette nummer af DANSK SPORTSMEDICIN indrykket et skema som kan klippes ud og sendes til DIMS' sekretær mhp. ansøgning om diplomanerkendelse. Samtidig er fristen for indsendelse af ansøgning udskudt til 31. december 2002. Herefter vil det til gengæld heller ikke længere være muligt at få diplomanerkendelse i idrætsmedicin på basis af ældre kurser.

Kommissoriet for Diplomuddannelsen i Idrætsmedicin blev vedtaget ved generalforsamlingen 2001. Ansøgningerne har været gennemgået, og indtil videre tyder det på at over halvdelen af ansøgerne godkendes.

Diplomuddannelsesudvalget (Arne Gam, Bent Wulff Jakobsen, Keld B. Andersen, Henrik Aagaard og Klaus Bak) beklager, at godkendelsesproceduren er trukket lidt i langdrag. Det skyldes ikke mangel på ansøgernes dokumenterede idrætsmedicinske erfaring, men snarere at med en overgangsordning er det svært at lave en retfærdig udvælgelsesprocedure.

Et svært punkt i godkendelsesproceduren er, at der blandt medlemmerne er mange der trods en fast tilknytning til idrætsklinikker eller hold, eller mange års erfaring med kirurgisk behandling af udvalgte idrætsskader ikke kan dokumentere den fornødne interesse for teoretisk bred idrætsmedicinsk uddannelse. Det idrætsmedicinske diplom skal især gives til personer som har tilegnet sig en bred almen viden indenfor idrætsmedicin. Dette får man ved at gennemgå formaliserede tværfaglige kurser og naturligvis også gennem praktisk klinisk erfaring. Det essentielle i idrætsmedicin er imidlertid, at man har en tværfaglig tankegang hvad enten dette drejer sig om doping, astma, korsbåndsrekonstruktion, operationsindikationer, skaderådgivning eller rehabilitering. Den praktiserende læge, den yngre læge, reumatologen, den kliniske fysiolog eller ortopædkirurgen skal genne teoretiske kurser (og årsmøde-deltagelse) have kendskab til et netværk af subspecialister så man kan yde sine patienter/idrætsudøvere den fagligt bedste behandling, Dermed kan man altså firkantet sagt være en ekspert indenfor sit felt, som er idrætsmedicinsk relateret, uden at være kvalificeret til idrætsmedicinsk diplomanerkendelse.

Internationalt halter udviklingen stadig noget. European Federation of Sports Medicine Associations (EFSMA) er primært dannet for at få anerkendt idrætsmedicin som speciale i EU og herunder naturligvis at styrke og samordne uddannelsen i Europa. Hvor der før var optimisme i EFSMA om at idrætsmedicin skulle godkendes som speciale i EU, så har denne står denne proces øjensynligt i stampe. Med diplomuddannelsens anerkendelse i Danmark kan vi måske være med til at påvirke udviklingen først og fremmest i Nordeuropa.

Jeg håber, at de resterende lægelige medlemmer af selskabet vil grave kursusbeviserne frem af skuffen inden årets udgang, og at diplomuddannelsen vil blive en succes i Danmark.

Næste uddannelseshøjdepunkt er Scandinavian Congress on Medicine and Science in Sports!

Fagforum
for
Idrætsfysioterapi

v/ Henning Langberg, Bestyrelsen

Idrætsmedicinsk kongres

Den skandinaviske idrætsmedicinske kongres – 6th Scandinavian Congress on Medicine and Science in Sports – løber af stablen den 21. november i Århus. Kongressen fungerer samtidig som DIMS årsmøde. Der er sammensat et meget spændende program, og det er mit håb, at der vil deltage rigtig mange idrætsmedicinsk interesserede fra hele Skandinavien.
En idrætsmedicinsk kongres er jo en mulighed for at udveksle praktiske erfaringer, knytte kontakter og høre det allernyeste inden for idrætsmedicinen. At være opdateret med litteraturen vil sige, at man kun er 1-2 år bagud med viden. På kongresser derimod, fremlægges dugfriske data, og der er mulighed for at diskutere relevans og implementering af det sidste nye. Vil man det, kræver det blot at man møder op.
Ser vi tilbage på de seneste skandinaviske kongresser, har de "desværre" været domineret af lokale deltagere – i Norge af nordmænd og i Sverige af svenskere osv. Dette er naturligt, men tendensen må ikke tage overhånd, for så udnyttes denne fantastiske mulighed for fælles-nordisk udveksling af viden ikke. Jeg er på nærværende tidspunkt ikke vidende om deltagersammensætningen i Århus – men håber at se såvel mange norske, svenske som finske kolleger.
Kongressens faglige niveau sikres dels af de indbudte foredragsholdere – og det lover godt – dels af de indsendte abstracts. Med hensyn til abstracts og disses niveau, tegner det også her til at blive en god kongres. Der er ankommet 83 abstracts – jeg har fået lov at kikke lidt i bunken og glæder mig meget. Emnerne for abstract'erne spænder fra basic science til interventionsstudier med stor relevans for idrætten. Men husk at deltage aktivt i diskussionen af de frie foredrag. Ofte er det unge forskere med fingeren på pulsen, som higer efter at diskutere. Giv dem en udfordring – intet spørgsmål er for dårligt.

Fysioterapeuter – ej kun på sidelinien

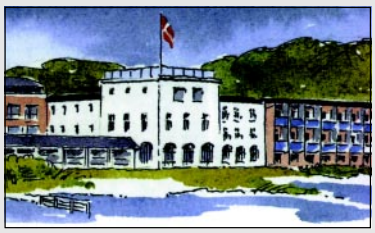
Denne overskrift har en dobbelt betydning. Det er nemlig rart at se, at stadig flere fysioterapeuter tager aktivt del i såvel idrætsforskningen som i den forebyggende del af idrætten (som træningsvejledere og/eller fysiske trænere).
Fysioterapeutuddannelsen er blevet løftet til bachelorniveau. Det har givet uddannelsens afsluttende projekter et sådant niveau, at flere af abstract'erne på den skandinaviske kongres er udarbejdet på baggrund af disse, hvilket lover godt for fremtiden. Blandt de nye fysioterapeuter, professionsbachelorerne, kan vi håbe at finde den nye generation af forskere med indsigt i forskningsmetodik og udgangspunkt i fysioterapi. Udviklingen kræver, at der skabes miljøer, hvor disse kræfter kan bruges, og at miljøerne er spredt over hele landet.

FFI og DIMS – fælles fremtid

Jeg har i anden sammenhæng (i Fysioterapeuten) argumenteret for, at træning er et af kerneområderne inden for fysioterapi, og derfor anser jeg også Dansk Idrætsmedicinsk Selskab og Fagforum for Idrætsfysioterapi for at være vigtige brikker i fysioterapeuters "kamp" for at opnå det nødvendige niveau af viden inden for området "aktiv træning og rehabilitering". Det er blevet besluttet fra begge organisationers side, at vi i fremtiden (fra 2004) skal afholde fælles årsmøder. Det vil sikre en god dialog og et højt fagligt niveau, men kræver igen at man møder op og gør sig gældende. Fælles kurser giver, på samme måde som fælles møder, mulighed for at udveksle erfaringer og koordinere viden mellem læger og fysioterapeuter. At der er interesse for fælles aktiviteter, peger blandt andet den store søgning til fælleskurset om vintersport på, og behovet bliver nok større i fremtiden. Jeg kunne håbe på, at vi i fremtiden kunne afholde fælles kurser om træningslære og praktisk anvendelse af aktiv rehabilitering. Det er her vi kan hjælpe en stor del af vores fælles idrætspatienter – ja endog forebygge at de bliver patienter.

Men inden vi tager hul på den fælles fremtid ses vi vel i Århus – ik'å??

FFI årsmøde og generalforsamling 2003



Fagforum for Idrætsfysioterapi afvikler sin generalforsamling 2003 lørdag, den 22. februar på Hotel Nyborg Strand.
Formen er et et-dages arrangement fra 11 til 16 indeholdende generalforsamlingen, en frokost og to faglige sessioner.
Programmet for dagen kan ses bag i bladet. Deltagelse vil være gratis for medlemmer af FFI.

Idrætsmedicin og tung styrketræning

Anvendelsen af tung styrketræning inden for den idrætsmedicinske rehabilitering og profylakse

Fysioterapeut, B.Sc., stud.scient. Thomas Bandholm, Institut for Idræt, Afdelingen for Human Fysiologi, Københavns Universitet

Indledning

Styrketræning anvendes ofte indenfor det idrætsmedicinske område som behandlingskomponent i en over-all rehabilitering efter en skade (1) og som komponent i profylaktisk træning (2). I dele af det etablerede idrætsmedicinske behandlingssystem og specielt i idrætsfysioterapeutiske kredse har empiriske overvejelser typisk ført til styrketræning udført med mange repetitioner (15 repetitioner) og lav belastning (15 RM (repetition maximum, red.)) både i forbindelse med rehabilitering og profylakse. Det har med andre ord været en antagelse, at lavt mekanisk stress ved udførelsen af styrketræning ville være effektivt i forhold til patologisk væv. Dette forhold skyldes formentlig både en manglende udredning af patologi-specifikke dosis-respons forhold og behandlertradition.

Post-operativ og non-operativ rehabiliterende styrketræning med et repetitionsantal over 15 og med en belastning på over 15 RM kan hverken kategoriseres som hypertrofitræning (8-10 RM med langsom udførelse) eller rate of force development (RFD)-træning (maksimal aktivering, 1-3 RM med eksplosiv koncentrisk fase), da repetitionsantallet er for stort og belastningen for lille (3). Paradoksalt nok er det ofte de parametre, der ønskes påvirket med implementeringen af styrketræning i rehabiliteringsplanen.

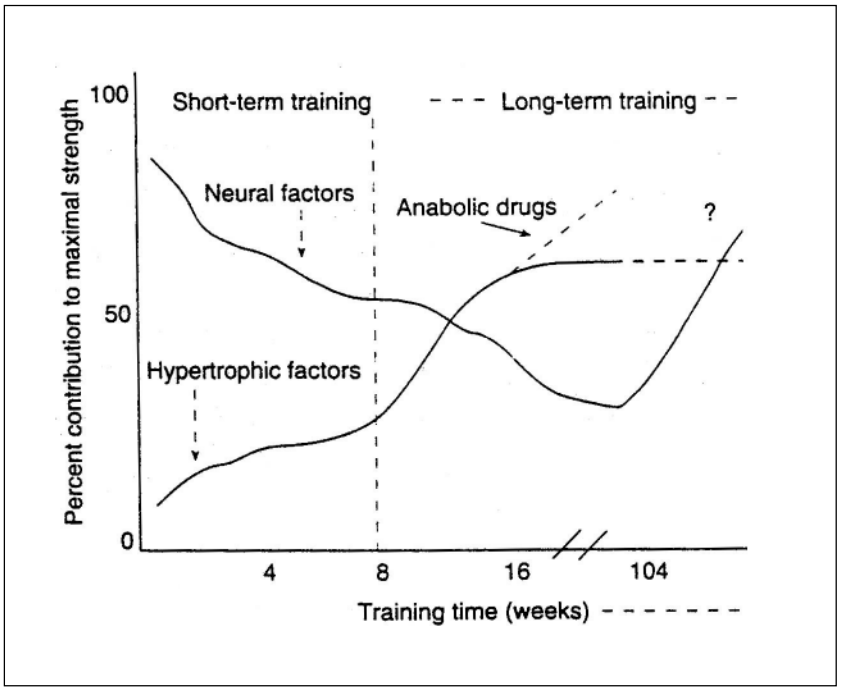
Der er indenfor de senere år fremkommet ny viden om en række neuromuskulære adaptationer til tung styrketræning (4, 5). En del af disse fund er tidligere beskrevet i Dansk Sportsmedicin (6). Det er intentionen med denne artikel – med baggrund i de fysiologiske fund – at diskutere mulige anvendelser af tung styrketræning i klinikken.

Adaptationer til styrketræning – en oversigt

For det utrænede individ forklares de umiddelbare forbedringer i muskelstyrke efter påbegyndelse af styrketræning oftest med adaptationer af central, neural karakter i modsætning til perifer, muskulær karakter (7). At neurale adaptationer i opstartsfasen har central karakter understøttes af unilaterale styrketræningsstudier, hvori der typisk observeres en cross-training effekt på kontralaterale, utrænede ekstremitet. Cross-training effekten på den kontralaterale ekstremitet består oftest i en forøgelse af det maksimale IEMG (8) og forøgelse af den maksimale muskelstyrke uden ledsagende muskulær hypertrofi (8, 9, 7). Det er uvist hvilke neurale adaptationer, der resulterer i denne cross-training effekt.

Efter 8-10 ugers træning begynder muskelmorfologiske forandringer at bidrage væsentligt til styrkeudviklingen (figur 1). En centralt adaptation er muskulær hypertrofi af den trænede muskulatur (7).

Figur 1 er udtryk for generelle betragtninger omkring tidsforløbet for adaptationer. Den kan give det indtryk, at fordi der normalt ikke observeres hypertrofi de første uger efter opstarten, så forekommer der ikke morfologiske forandringer i samme periode. Det er i den anledning observeret, at så lidt som 5 træningspas (over 2 uger) kan



Figur 1: Sammenhæng mellem neurale og hypertrofiske faktorers procentuelle bidrag til den maksimale styrke. Fra (10).

inducere en signifikant reduktion i den procentuelle andel af de hurtigste og mest eksplosive muskelfibre (type IIX), hvilket blev understøttet af en kvantitativ elektroforetisk analyse af myosin heavy chain (MHC) komposition (11). Omvendt er det observeret, at hos både ældre (~ 61 år) og yngre mænd (~ 29 år) kan styrketræning medføre neurale adaptationer (IEMG) så sent som fra 6. til 10. uge efter opstart (12).

Selv om figuren således er simplificeret, så giver den et overblik over tidsforløbet for adaptationer til styrketræning.

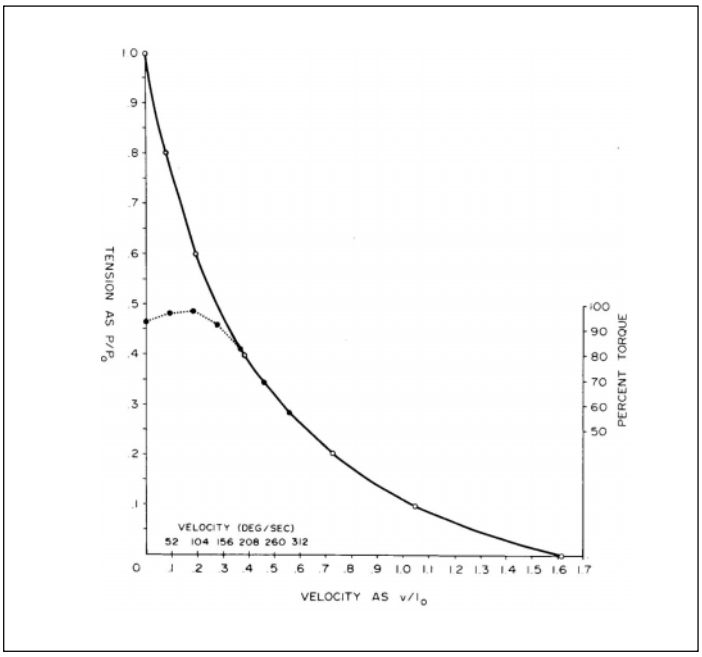
Terapeutisk anvendelse af tung styrketræning

Anvendelsen af tung styrketræning som et led i behandling eller som profylakse forudsætter en forudgående periode med progressiv medium-tung styrketræning (10-15 RM). Denne periode bør inkludere et fokus på korrekt teknisk udførelse af de valgte øvelser. For konkurrence-idrætsfolk på divisionsniveau eller højere vil styrketræning typisk indgå som en del af den ugentlige træning, og de vil derfor ofte have en god "styrketræningsgrundform". Det vil således være uproblematisk uden videre at iværksætte tung styrketræning som et profylaktisk tiltag.

Situationen er en anden efter idrætsmedicinsk kirurgi (f.eks. efter ACL rekonstruktion), hvor adaptationer efter tidligere styrketræning (f.eks. maksimalstyrke) aftager på baggrund af faktorer som infusions- eller smerteinduceret refleks-inhibition (13). Her må igen påtænkes en tilvænningsperiode med lettere styrketræning, før den tunge styrketræning kan implementeres. Samme forhold gør sig gældende ved tung profylaktisk styrketræning af styrke-utrænede personer. For den resterende diskussion af terapeutiske muligheder med anvendelsen af tung styrketræning forudsættes en grundtræningsperiode som beskrevet.

Neural inhibition under maksimale kontraktioner

Perrine og Edgerton observerede allerede i 1978 en manglende overensstemmelse imellem in-vivo human og in-vitro animal bestemmelse af force/moment-velocity relationen (14).



Figur 2: Figuren illustrerer forskellen imellem force/moment-velocity relationen bestemt in-vitro på isolerede animale muskelpræparater (o) sammenlignet med samme relation bestemt humant in-vivo i et isokinetisk dynamometer (•). Fra vinkelhastigheder på 208 deg/sec og til den isometriske kontraktion på 0 deg/sec ses en neural inhibition for de humane forsøg. Fra (14).

Til forskel fra tidligere animale in-vitro forsøg på isolerede muskelpræparater viste de humane in-vivo forsøg et plateau i kraftudviklingen ved de lave koncentriske vinkelhastigheder, og at den isometriske kontraktionskraft ikke som forventet var større end alle koncentriske vinkelhastigheder (se figur 2). Forfatterne beskrev dette plateau som en beskyttende neural inhibitionsmekanisme som skulle hindre stor muskulær spændingsudvikling.

Westing et al., (1990) udførte med baggrund i studiet af Perrine & Edgerton (1978) et tilsvarende studie på moment/velocity-relationen. De fandt, at maksimal elektrisk muskelstimulation udløste et større moment (21-24 %) under ekscentrisk kontraktion i forhold til maksimal voluntær ekscentrisk muskelkontraktion (15). De kunne imidlertid ikke påvise samme manglende voluntære aktivering af muskulaturen ved langsom koncentrisk muskelkontraktion som forventet på baggrund af studiet af Perrine & Edgerton.

Westing et al., benyttede forsøgspersoner, der havde styrketræning som en del af deres ugentlige træning, hvor Perrine & Edgerton benyttede forsøgspersoner med ikke nærmere beskrevet træningsbaggrund. Det er muligt, at denne forskel i det inkluderede materiale kan forklare den tilsyneladende manglende neurale inhibition ved langsom koncentrisk kontraktion. Den neurale inhibition under de maksimale koncentriske kontraktioner med lav hastighed kunne således være trænet væk før inklusion i studiet af Westing et al. Trænerbarheden af denne neurale inhibition er senere undersøgt af Aagaard et al., (2000), som undersøgte effekten af tung styrketræning på den neuromuskulære aktivering af quadriceps under voluntære koncentriske og ekscentriske kontraktioner (5). De fandt, at 14 ugers tung progressiv styrketræning resulterede i større neuralt drive til muskulaturen (~ mindre motorneuron inhibition) for både hurtig og langsom ekscentrisk kontraktion samt ved langsom koncentrisk kontraktion. Motorneuron inhibitionen var enten formindsket eller fjernet efter træning. De præcise neurofysiologiske mekanismer bag denne modulering er stadig uklare, men det synes klart, at påvirkningen af det enkelte motor neuron kan have sin oprindelse fra mange strukturer i og uden for CNS.

Descenderende baner (corticospinale og andre) kan potentielt modulere aktiviteten i den aktive motor-pool til muskulaturen og/eller modulere det somato-sensoriske input til motorpool´en (16, 17). Interessen har blandt andet samlet sig om input fra Golgi organerne. Det er sandsynligt, at præsynaptisk kontrol (fra supraspinale områder i CNS) af spinale Ib-inhibitoriske interneuroner kan ændres som følge af styrketræning (5). Effekten vil være en ændring i den effektive synaptiske transmission, og dette forhold kan muligvis forklare et bortfald af den neurale inhibition af aktive muskler under ekscentriske og langsomme koncentriske maksimale kontraktioner. Dette bortfald får selvsagt en positiv effekt på den muskulære maksimalstyrke.

Maksimalstyrke

Caiozzo et al., (1981) undersøgte effekten af to isokinetiske styrketræningsregimer (10 RM ved hhv. 1,68 og 4,19 rad (sec-1). De fandt, at gruppen, der trænede med den store belastning (1,68 rad (sec-1)), øgede deres maksimale koncentriske styrke for alle de undersøgte koncentriske vinkelhastigheder. Det lette styrketræningsregime (4,19 rad (sec-1) inducerede en øgning i den maksimale koncentriske styrke for de vinkelhastigheder, der lå tæt på træningshastigheden (18).

Aagaard et al., (1996) fandt, at maksimal isokinetisk ekscentrisk styrke (-240, -120 og –30 deg (sec-1) samt koncentrisk styrke (30 deg (sec-1) steg signifikant efter 12 ugers isokinetisk tung koncentrisk styrketræning (8 RM). Styrketræning med lavere belastning (24 RM) resulterede i samme studie ikke i signifikante ændringer i isokinetisk maksimalstyrke hverken for koncentriske eller ekscentriske hastigheder (4).

Aagaard et al., (1996) fandt ingen effekt på de anvendte styrkeparametre efter lettere styrketræning (24 RM), hvilket er i modsætning til fundene i studiet af Caiozzo et al., (1981), og kan skyldes flere faktorer. Caiozzo et al. benyttede samme træningsog testapparatur og man kan derfor ikke udelukke en markant læringseffekt. Aagaard et al. benyttede elitefodboldspillere og kunne derfor ikke udelukke, at styrkeforbedringer efter 12 ugers styrketræning med lav belastning udeblev på grund af et for lille træningsstimulus. Det er derfor ikke umuligt, at lettere styrketræning kan øge den maksimale isokinetiske styrke, men det vil formentlig afhænge af forsøgspersonernes styrketræningstilstand ved inklusionen.

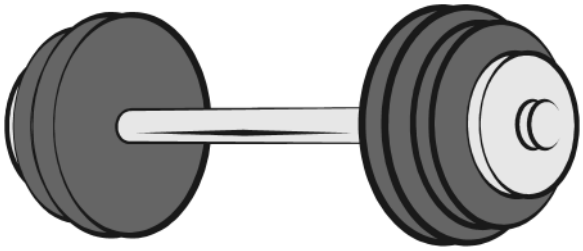
En lidt naiv tolkning på baggrund af ovenstående kunne være, at tung styrketræning inducerer mere globale ændringer i maksimal muskelstyrke, end det er tilfældet for styrketræning udført med mindre belastning. Den lettere træning ser ud til kun at have transfer til vinkelhastigheder tæt på træningshastigheden (18, 19) eller ingen målbar effekt eller transfer (4).

Målet med denne artikel er ikke en detaljeret gennemgang af styrketræning mht. specificitet, men det skal retfærdigvis siges, at billedet sandsynligvis ikke er så klart som skitseret ovenfor. Det er formentlig ikke de faktiske forhold, at lettere styrketræning ikke inducerer øgning af den maksimale isokinetiske styrke, men at denne effekt vil være afhængig af forsøgspersonernes styrke-udgangsniveau som tidligere nævnt.

Der synes dog at være indikationer på, at kun tung styrketræning kan inducere væsentlig forøgelse af den maksimale ekscentriske styrke, selv når træningen kun udføres koncentrisk (4).

Ændringer i inhibition og maksimalstyrke - implikationer for praksis

I forbindelse med idrætsmedicinsk rehabilitering er der ofte en tidsbegrænset periode til at opnå forbedringer i patientens funktionsniveau. Det vil sige, at der er en begrænset periode til at returnere til det præ-operative niveau for f.eks. muskeltværsnit og muskelstyrke. Det synes sandsynligt, at dette niveau kan opnås hurtigere gennem tung styrketræning end ved lettere styrketræning, da lettere styrketræning ikke altid medfører styrkeforbedringer (4). Tung styrketræning moduler endvidere den neurale inhibition under maksimale kontraktioner, hvilket formentlig ikke er tilfældet i samme grad for lettere styrketræning. Dette øger især den maksimale ekscentriske kontraktionskraft, hvilket kan være betydningsfuldt, specielt for antagonist muskulaturen, i retning af at øge den dynamiske ledstabilitet under bevægelser, der kræver stor ekscentrisk kraftudvikling (20).



Det er klart, at et rekonstrueret ACL efter 3 uger ikke tåler belastninger som tung styrketræning vil medføre. Derfor bør den tunge styrketræning placeres senere i et rehabiliteringsforløb på et tidspunkt, hvor de traumatiserede strukturer har opnået tilstrækkelig styrke. Den tunge styrketræning vil her kunne inducere en hurtig styrkeforøgelse samt muskulær hypertrofi. På denne måde vil der kunne opnås nærmaksimale styrkeforbedringer og en væsentlig grad af hypertrofi indenfor en kort tidsperiode.

H/Q-ratio

Aagaard et al., (1996) fandt, at tung isokinetisk styrketræning forårsagede ændringer i den funktionelle hamstring/quadriceps styrke-ratio (H/Q-ratio). Ratioen angiver forholdet mellem maksimal hase og quadriceps muskelstyrke ved en given knæekstensionshastighed. Den maksimale muskelstyrke kan yderligere angives som enten koncentrisk eller ekscentriske kraft. Den funktionelle H/Q-ratio bestemmes hhv. som Hcon/Qecc og Hecc/Qcon i modsætning til tidligere bestemmelser af H/Q-ratioer som Hcon/Qcon og Hecc/Qecc. Aagaard et al., (1996) fandt, at den muskulære stabilisering af knæleddet og specielt forreste korsbånd (ACL) blev forbedret efter tung styrketræning, evalueret ved en øgning i Hecc/Qcon under hurtig knæekstension (240 deg (sec-1). En påvirkning af H/Q-ratioen kunne i samme studie ikke påvises efter lettere styrketræning (24 RM) (4).

Den funktionelle H/Q-ratio som testparameter er tidligere vist at kunne diskriminere mellem ACL insufficiente og ikke-ACL insufficiente knæ (13). Det er

dog problematisk at sammenligningen blev foretaget på baggrund af H/Q-ratioer bestemt som peak moment ved forskellige ledvinkler, og ikke som peak moment ved en specifik isokinetisk ledvinkel. Idet peak momentet for knæekstensorerne vil forekomme ved en anden ledvinkel end for knæfleksorerne (13), kan dette give et falsk billede af styrkeforholdet mellem antagonisterne.

Ændringer i H/Q-ratioen - implikationer for praksis

Det lader til, at en neurofysiologisk adaptation til ACL-incufficiens er øget H/Q-ratio. Det er således observeret, at personer med ACL-insufficiente knæ har højere H/Q-ratioer end det er tilfældet for samme personers ikke-ACL-insifficiente knæ (13). Det er muligt, at denne adaptation på baggrund af patologi sikrer en bedre dynamisk kontrol af ledstabiliteten i situationer, hvor lårets knæekstensorer udvikler stor kraft.

Tung styrketræning ser ud til at øge den funktionelle H/Q-ratio mens lettere styrketræning ikke ser ud til at påvirke denne parameter (4). Idet den naturlige kompensation for læderet eller rupteret ACL ser ud til at være en forøgelse af H/Q ratioen (13), er det sandsynligt, at en trænings-induceret forøgelse af denne er optimal. Denne forøgelse af H/Q-ratioen vil teoretisk kunne aflaste ACL. Forøgelsen kan tilsyneladende induceres ved gennemførelse af et regime med tung styrketræning. Det er muligt, at dette vil have både rehabiliterende og profylaktisk effekt specielt indenfor idrætter, hvori der indgår dynamiske retningsskift og opbremsninger.

Rate of force development (RFD)

Evnen til at udvikle meget høj muskelkraft indenfor kort tid – og specielt i den tidligste fase af en kontraktion – betegnes som en muskels evne til at lave eksplosiv muskelkraft, eller som rate of force development (RFD = (F/(T). I mange idrætsgrene indgår bevægelser af kortere varighed end 200 ms som f.eks. afsæt til et længdespring (6). Da de fleste muskler efter 200 ms aktivering ikke har opnået maksimal spænding/udvikler maksimal kraft, så bliver den spænding/kraft der kan opnås indenfor de f.eks. 200 ms af stor betydning. Rate of force development vil således i mange situationer være af større betydning end maksimalkraften.

Rate of force development afhænger af rekrutteringen af motor units, af fyringsfrekvensen i de aktive motor units og af den aktiverede muskulaturs kontraktile karakteristika (3). Type IIX fibre har en større intrinsic RFD end både type IIA og type I (21). Muskler, der indeholder procentuelt mange type II fibre (specielt IIX), vil således kunne lave høj RFD såfremt alle fibre kan aktiveres.

Tung styrketræning inducerer forbedringer i muskulaturens eksplosive kraftegenskaber (6) på trods af, at den ikke umiddelbart synes eksplosivt udført. Det skyldes formentlig, at skiftet fra den ekscentriske fase til den koncentriske fase under udførelsen af træningen kræver en maksimal aktivering af muskulaturen for at accelerere belastningen op i hastighed. Det er muligt, at nødvendigheden af at accelerere belastningen op i hastighed ved faseskiftet i bevægelsen er årsagen til den træningsinducerede ændring i RFD. I den sammenhæng viste Behm & Sale (1993), at den intenderede ledvinkelhastighed snarere end den realiserede vinkelhastighed under styrketræning var afgørende for forandringer i RFD (22). De teoretiserede, at intentionen om eksplosiv udførelse under styrketræning med stor belastning påvirker de eksplosive kraftegenskaber på trods af manglende effektueret høj vinkelhastighed ved meget tunge eller statiske belastninger.

Ændringer i RFD - implikationer for praksis

RFD er af stor betydning for mange idrætsgrene, hvor eksplosive aktiviteter har en varighed på under 300-400 ms som tidligere beskrevet. Det er imidlertid sandsynligt, at denne styrkeparameter ligeledes er af stor betydning indenfor den idrætsmedicinske rehabilitering og profylakse.

Fintebevægelser og hurtige spilrelaterede opbremsninger kræver stor kraftudvikling på kort tid, specielt i antagonist muskulatur, analogt til afsættet under et længdespring. Den kraft, der kan udvikles under udførelsen af en finte i håndbold, bliver afgørende for ledstabiliteten og dermed for stresset på strukturer som ACL. Hermed bliver RFD formentlig vigtigere for den dynamiske ledstabilitet under eksplosive retningsskift end den maksimale muskelstyrke.

For ældre personer udgør fald en risiko for hofte- eller hoftenære frakturer. Disse frakturer kræver kirurgi og ofte et længerevarende rehabiliteringsforløb. I en potentiel faldsituation er det muligt, at høj RFD vil kunne muliggøre en hurtig postural korrektion og derved bevirke en opretholdelse af den stående stilling (6). Et hurtigt stemskridt/udfaldsskridt til siden, hvor quadriceps udvikler stor og hurtig kraft, vil sandsynligvis i mange tilfælde kunne reetablere balancen i den stående stilling.

Antagonist co-aktivering

Den muskulære ledstabilitet afhænger blandt andet af antagonist co-aktivering. Denne stabilitet betegnes typisk som værende af dynamisk karakter. For knæleddet er hasemuskulaturen ACL-antagonister og kan potentielt modvirke anteriort-rettede kræfter, der belaster ACL. Hasemuskulaturen kan endvidere betragtes differentieret som en muskelgruppe, der kan kontrollere rotationer af underbenet i forhold til femur. Øget kontraktion af biceps femoris i forhold til de resterende knæfleksorer kan således modvirke internal tibiarotation og derved reducere belastningen på ACL (6, 19).

Det er observeret, at antagonist haseaktiviteten under isoleret knæekstension er størst for biceps femoris (lateral) i forhold til semitendinosus (medial) (20), og at dette størrelsesforhold moduleres efter en periode med tung styrketræning. Det ser ud til, at tung styrketræning inducerer en selektiv nedregulering i medial hase (semitendinosus) co-aktivitet, mens lateral hase (biceps femoris) co-aktivitet ikke ændres signifikant (6). Den funktionelle betydning af dette forhold er en øget lateral hase co-aktivering under knæekstension med en potentiel aflastning af ACL til følge.

Muskulær udholdenhed

Indenfor idrætsfysioterapien fremhæves det ofte, at styrketræning gennemføres med mange gentagelser for at opnå en forbedring af den muskulære

udholdenhed. De knæstabiliserende muskler skal med andre ord skal kunne stabilisere knæet aktivt gennem en hel kamp og ikke kun udvikle stor kraft i en begrænset periode.

Tung styrketræning kan inducere forøgelse af den muskulære udholdenhed, hvilket umiddelbart kan virke paradoksalt. En simpel styrketest, hvor det maksimale antal repetitioner med en given belastning benyttes som udtryk for den muskulære udholdenhed kan illustrere dette forhold.

En forøget maksimalstyrke vil betyde at præ-testens absolutte belastning vil udgøre en mindre procentuel del af den ny-opnåede maksimalstyrke. Der vil derfor efter gennemførelsen af styrketræningsregimet kunne foretages flere repetitioner med præ-testens belastning. Udholdenheden er med andre ord også forbedret efter tung styrketræning. Det er dog muligt, at de morfologiske forandringer efter lettere styrketræning vil muliggøre en endnu større muskulær udholdenhed, end det vil være tilfældet efter tung styrketræning. Her tænkes især på en række biokemiske processer som f.eks. kapaciteten for intracellulær buffering af H+.

Overførbarhed af den tunge træning

Funktionel styrketræning anvendes ofte af idrætsfysioterapeuter for at optimere den rette motoriske kontrol med det rette somato-sensoriske feedback. Det vil sige, at styrketræningen gennemføres i meget spil-nære opstillinger. Skal det ACL-rekonstruerede knæ være stabilt under et stemskridt, så trænes styrken specifikt ved udførelsen af f.eks. dynamiske udfaldsskridt. På denne måde er den funktionelle styrketræning sjældent udført tungt, men den er specifik i forhold til den dyrkede idræt.

Aagaard et al., (1996) undersøgte effekten af vægtbelastede sparkebevægelser (funktionel styrketræning) i forhold til let (24 RM) og tung (8 RM) styrketræning. Ingen af de tre benyttede styrketræningsregimer inducerede signifikante forandringer i maksimal boldhastighed under udførelsen af et maksimalt spark mod mål. Forfatterne konkluderede, at det motoriske program for det vægtbelastede spark afveg fra det integrerede motoriske sparkeprogram, og at en effekt på den maksimale boldhastighed derfor udeblev (4). Det er dog tidligere observeret at et funktionelt styrketræningsprogram såvel som et formelt styrketræningsprogram (f.eks. udført i maskiner) kan føre til forbedret præstation i funktionelle tests samt forøget maksimalstyrke (13).

Grimby (1992) er af den overbevisning, at den funktionelle styrketrænings vigtigste formål er at forbedre dynamisk stabilitet og motorisk kontrol i forbindelse med en given bevægelse. En kombination af begge typer styrketræning (funktionel og tung styrketræning) synes derfor optimal (13).

En nærliggende tanke er, at decideret tung styrketræning (f.eks. benpres) skal kombineres med udførelsen af de specifikke idrætsbevægelser, hvori den opnåede styrke ønskes udnyttet for at få effekt. I forbindelse med denne transfer bør fokus være på at benytte de ekstra ressourcer (styrke) og derved få dem implementeret i det integrerede motoriske program. Effekten kan sandsynligvis udnyttes både på det præstations-fremmende område men i lige så høj grad på det skadesforebyggende område.

Hvorfor benytte tung styrketræning i rehabilitering?

Artiklen er ment som en diskussion af terapeutiske muligheder med tung styrketræning, der afviger fra mulighederne med lettere styrketræning. Det har ikke været formålet at opfordre til ukritisk brug af tung styrketræning. Det har i stedet været hensigten at pege på en række områder, hvor denne type træning har vist sig at inducere adaptationer, der potentielt kunne udnyttes i den idrætsmedicinske rehabilitering og profylakse. Det må være de specifikke mål med træningen (øget RFD, øget maksimalstyrke, øget anatomisk tværsnit osv.) der i sidste ende afgør, hvilken form for styrketræning, der med fordel kan anvendes.

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Free papers – 6th Scandinavian Congress on Medicine and Science in Sports 2002

Oral presentations - overview:

Thursday november 21st, 19:00 - 20:00

"Store sal"
Sport injuries / knee injuries

01. Strategies to avoid football injuries - a study of the Swedish Super-League year 2001.
J Ekstrand, M Hägglund, M Waldén
Linköping University, Sweden
02. Hypermobility is not a problem in male soccer.
P Hölmich, M Hansen, P Weidemann, J Parner
Amager Hospital, Copenhagen, Denmark
03. Stress fractures among Swedish middle and long distance runners.
J Bolgerth, P Thomeé, R Thomeé
Göteborg University, Sweden
04. Preliminary results after repair of the medial patellofemoral ligament in primary dislocation of the patella.
SE Christiansen, BW Jakobsen
University Hospital of Aarhus, Denmark
05. Reconstruction of the posterolateral corner. A new surgical procedure.
BW Jakobsen, B Lund, S Kjeldsen, SE Christiansen
University Hospital of Aarhus, Denmark

"Lille sal"
Shoulder / Biomechanics

06. Ultrasonography in the pre-operative evaluation of patients with recurrent anterior shoulder instability.
J Karlsson, P Kälebo, A Baranto, P Wiger, O Lundin
Sahlgrenska University Hospital, Göteborg, Sweden
07. Revisting the open Bankart experience in a long-term follow-up.
L Magnusson, J Kartus, L Ejerhed, I Hultenherin, N Sernert, J Karlsson
Köping Hospital, Norra Älvsborg County Hospital and Sahlgrenska University Hospital, Köping, Trollhättan and Göteborg, Sweden.
08. Rib stress fractures in elite rowers: EMG and 2-D video analysis.
A Vinther, T. Alkjær, IL Kanstrup, B Larsson, S.P. Magnusson, P Aagaard
Herlev Hospital, The Panum Institute, Bispebjerg Hospital, University of Copenhagen, Denmark, Lund University, Sweden
09. Definition of a new H/Q ration based on explosive strength.
M K Zebis, M Kjær, P Aagaard
University of Copenhagen, Bispebjerg Hospital, Danmark
10. Reproducibility of jump height, power- and force parameters during countermovement jumps.
J Bojsen-Møller, P Hansen, S P Magnusson, M Kjær, P Aagaard
Bispebjerg Hospital, University of Copenhagen, Danmark

Friday november 22nd, 16:30 - 18:00:

"Store sal"
Tendons

11. Effect of eccentric training on collagen synthesis rate in elite soccerplayers with chronic achilles tendinosis.
H Ellingsgaard, T Madsen, J Jansson, P Magnusson, P Aagaard, M Kjær, H Langberg
Bispebjerg Hospital, Denmark
12. Balance and injuries before and after 5 weeks of ankle discs training.
L Damsbo, L Johansen, L Zebiz, M Andersen, K Froberg, N Wedderkopp
Odense, Middelfart Hospital, Denmark
13. The ultrasonographic appearance of the ruptures achilles tendon. A longitudinal evaluation of surgical and non-surgical treatment, with comparisons with MRI appearance.
M Möller, P Kälebo, G Tidebrant, T Movin, J Karlsson
Göteborg, Stockholm, Sweden
14. Changes in local and systemic IGFBP´s in relation to local induced type I collagen synthesis after different forms of acute exercise.
J.L Olesen, H Langberg, K Heinemeier, C Gemmer, A Flyvbjerg, M Kjær
Bispebjerg Hospital, Denmark
15. ESWT in patellar and achilles tendinopathy: a double-blind, placebo controlled, randomised clinical trial.
K Peers, S Lambrecht, R Lysens
University Hospitals Leuven, Belgium
16. Iontophoresis with or without dexamethaxone in the treatment of acute achilles tendon pain.
C Neeter RPT, R Thomeé, K G Silbernagel, P Thomeé, J Karlsson
Göteborg University. Sweden
17. Treatment with eccentric overload for patients with chronic pain from the achilles tendon - A prospective, randomised and controlled study, with reliability testing of the evaluating methods.
K Grävare Silbernagel, R Thomeé, P Thomeé, J Karlsson
Göteborg University, Sweden

Saturday november 23rd, 11:15 - 12:15

"Lille sal"
Behavioral medicine in sports & training

18. Patients use of a diary as a tool for personal reflection and as a communication tool.
N Billenstein Schriver
University of Copenhagen, University of Aarhus, Denmark
19. Why do patients with an ACL-tear choose surgical treatment?
L R Swirtun, K Eriksson, P Renström
Karolinska Institutet, Stockholm, Sweden
Stockholm Söder Hospital, Karolinska Institutet, Sweden
20. Acute growth hormone administration increases fat metabolisation but not fat oxidation during moderate intensity bicycling.
M Hansen, R Morthorst, K H W Lange, B Larsson, A Flyvbjerg, H Ørskov, A Astrup, M Kjær
Bispebjerg Hospital, Copenhagen, Denmark, Aarhus University Hospital, Denmark, The Royal Veterinary and Agricultural University, Frederiksberg, Denmark.
21. Postoperative heavy-resistance strength training increases explosive muscle force in elderly patients.
C Suetta, P Aagaard, P Magnusson, A K Jacobsen, J Berget, U Dalgas, B Duus, M Kjær
Bispebjerg Hospital, Denmark
22. Effect of preexhaustion exercise on lower extremity muscle activation during a leg press exercise
J Augustsson, R Thomeé, P Hörnstedt, J Lindblom, J Karlsson, G Grimby
Göteborg University, Sweden

14:00 - 15:00

"Lille sal"
Young Scandinavian Sports Medicine Investigator Award
Winner presentation

Effects of electrical stimulation-induced leg training on skeletal muscle adaptability in spinal cord injury
R. M. Crameri, A. Weston, M. Climstein, G.M. Davis, J. R. Sutton,
Sports Medicine Research Unit, Bispebjerg Hospital, Denmark & School of Exercise and Sport Science, The University of Sydney, Australien.

Training & prevention

23. Balance before and after short anaerobic and intermittent exercise.
N Wedderkopp, L Johansen, L Zebitz, L Damsbo, M Andersen, K Froberg
Middelfart Hospital, Odense University, University of Southern, Denmark
24. Physical activity in adolescence and in adulthood and inherited characteristics as predictors of blood pressure.
M Hernelahti, E Levälahti, R Simonsen, J Kaprio, U Hujala, A Uusitalo-Koskinen, T Videman
University of Helsinki, Finland, University of Alberta, Canada
25. Strength training induces long-lasting neural adaptation during maximal eccentric muscle contraction.
L Andersen, P Aagaard, J L Andersen, K Klausen
Bispebjerg Hospital, Copenhagen, Denmark

15:45 - 17:00

"Store sal"
ACL injuries

26. A two-to-ten year follow-up of anterior cruciate ligament reconstruction in 999 patients, with a normal contralateral knee.
G Laxdal, J Kartus, L Ejerhed, N Sernert, L Magnusson, J Karlsson
Sahlgrenska University Hospital, Norra Älvsborg County Hospital, Köping Hospital, Göteborg, Trollhättan and Köping, Sweden
27. A short and middle term follow-up after arthroscopic anterior cruciate ligament reconstruction.
J Larsson, A Bishop, L Magnusson, N Sernert, B Lindmark, J Kartus, J Karlsson
Köping Hospital, Norra Älvsborg/Uddevalla Hospital, Uppsala University, Sahlgrenska University Hospital, Göteborg, Sweden
28. The strain on the ACL during four different closed kinetic chain exercises - an in vivo study.
A Heijne, C F Braden, G D Peura, P A Renström, S Werner
Karolinska Institut, Stockholm, Sweden, University of Vermont, Burlington, USA
29. Reconstruction of the anterior cruciate ligament in children and skeletal immature adolescents.
SE Christiansen, S Kjeldsen, B Lund, BW Jakobsen
University Hospital of Aarhus, Denmark
30. Home based rehabilitation after anterior cruciate ligament reconstruction.
K Jensen, B W Jakobsen
University Hospital of Aarhus, Denmark
31. Rehabilitation of ACL-deficient patients: effect of heavy resistance training and protein supplementation.
L Holm, B Esmarck, H Hansen, K Matsumoto, M Mizuno, M Kjær
Bispebjerg Hospital, Copenhaven, Denmark, Saga Japan, Esbjerg Varde Central Hospital, Denmark

"Lille sal"
Physiology/Biomechanics

32. Hamstring strain injury in elite soccer players: Viscoelastic response, RFD and H/Q strength ration.
T Jørgensen, J Kromann, C Østergaard, S P Magnusson, P Aagaard
Bispebjerg Hospital, Copenhagen, Denmark
33. Activation of satellite-cells and remodelling of the extracellular matrix after a bout of eccentric-exercise.
R Crameri, H Langberg, CH Jensen, HD Schrøder, B Teisner, S Koskinen, M Kjær
Bispebjerg Hospital, Copenhagen, Odense University Hospital, Denmark

34. Exposure of the adolescent porcine spine to mechanical flexion-compression and extension-compression
A Baranto, L Ekström, L Swärd, M Hallström, O Lundin, S Holm
Sahlgrenska University Hospital, Göteborg University, Sweden
35. Respiratory symptoms and lung functions in male athletes.
T Lund, L Pedersen, B Larsson, B N Jensen, V Backer
Bispebjerg Hospital, University Hospital of Copenhagen, Denmark
36. Creatine depleted humans have normal exercise capacity with high oxygen consumption during exercise.
K Peltola, J Kapanen, O Simell, K Näntö-Salonen, O J Heinonen
University of Turku, Finland
37. Increased muscle mass with creatine, protein and carbohydrate supplementation.
S Olsen, G Tufekovic, R Crameri, J L Olesen, C Suetta, P Aagaard, M Kjær
Bispebjerg Hospital, Copenhagen, Denmark

Sunday november 24th, 11:00 -12:30:

"Store sal"
Award presentation

38. Risk assessment in top-level football. A prospective investigation of the super-leagues in Denmark and Sweden.
M Hägglund, J Ekstrand, M Waldén
Sweden
39. Role of TGF-B in relation to exercise-induced local collagen synthesis in human tendinous tissue.
K Heinemeier, H Langberg, J L Olesen, M Kjær
Bispebjerg Hospital, Copenhagen, Denmark
40. Resistance-training improves muscle strength, functional level and self-reported health in patients with chronic pulmonary disease.
N Beyer, M K Madsen, V Backer, K Jørgensen, L Larsen, M Kjær
Bispebjerg Hospital, Copenhagen, University of Copenhagen, Denmark
41. The effects of combined endurance and strength training on relevant performance parameters in young competitive cyclists.
M Bennekou, B Larsson, P Aagaard
Bispebjerg Hospital, Universital Hospital of Copenhagen, Denmark
42. Changes in shoulder muscle activity during experimentally induced pain.
A K N Winther, L C P R Diederichsen, P Dyhre-Poulsen, M R Krogsgaard, J Nørregaard
Bispebjerg Hospital, Copenhagen, Denmark
43. Four weeks of taping can improve sensomotoric control in healthy ankles.
P Knudsen, J Saxkjær, E Friis, P Magnusson, P Aagaard, M Kjær, H Langberg
Bispebjerg Hospital, Copenhagen, Denmark

Posters – overview:

Knee injuries:

P1. A long-term MRI-study after harvesting patellar tendon autografts.
M Svensson, J Kartus, L Ejerhed, S Lindahl, J Karlsson
NU Hospital and Sahlgrenska University Hospital, Trollhättan/Uddevalla and Göteborg, Sweden
P2. Is there a difference in laxity between right and left knees?.
N Sernert, J Kartus, L Ejerhed, J Karlsson
Norra Älvsborg/Uddevalla Hospital, Sahlgrenska University Hospital, Göteborg University, Sweden
P3. Bioabsorbable interference screw socket shape comparison using 3-D models.
P Agvenjärvi, V Vuorisalo, J Koljonen
Tampere University of Techlology, Finland
P4. Clinic based rehabilitation compared to home based rehabilitation after cruciate ligament reconstruction.
B Ringby
Århus amtssygehus, University Hospital of Aarhus, Denmark
P5. Early results after ACL-reconstruction using hamstring tendons fixed with RCI-screws.
K Saxtrup, S Kjeldsen, K Døssing
Silkeborg Hospital, Denmark
P6. The effect of ACL surgery on bone mineral in the calcaneus. A prospective study with a two-year follow-up.
L Ejerhed, J Kartus, R Nilsen, U Nilsson, R Kullenberg, J Karlsson
Norra Älvsborg/Uddevalla Hospital, Trollhättan/Uddevalla, Sahlgrenska University Hospital, Göteborg, Sweden
P7. Knee injury and osteoarthritis outcome-score (KOOS) one year after ACL-reconstruction.
K Saxtrup, S Kjeldsen, K Døssing
Silkeborg Hospital, Denmark
P8. Surgical treatment of medial plica syndrom (MPS) among athlete.
Y F Mohammad
Hodaidah, Yemen
P9. Group information to patients preparing for anterior cruciate ligament reconstruction.
H Pedersen, L Frandsen, B Lund
Århus amtssygehus, Aarhus University Hospital, Denmark
P10. Interactive patient information before anterior cruciate ligament reconstruction.
L Frandsen, H Pedersen, B Dieckmann, B Hansen, S E Christiansen, B W Jakobsen
Århus amtssygehus, Aarhus University Hospital, Denmark
P11. Patellofemoral pain syndrome - pain, coping strategies and degree of well-being.
P Thomeé, R Thomeé, J Karlsson
Göteborg University, Sweden
P12. The effect of physiotherapeutic intervention after artroscopic knee surgery.
B Hølledig
University Hospital of Aarhus, Denmark
P13. Effects of osteoset bone graft substitute on bone healing in humans.
J Petruskevicius, S Kaalund, S Nielsen, P Knudsen, S overgaard
Randers County Hospital, Aarhus County Hospital, Denmark

Lower extremity:

P14. Manual diagnosis of talar dysfunction after inversion trauma.
N Erichsen, J O Møller, T Kaiser, M L Jensen, I Märcher, U Rune, H Lund, H Bliddal
Gentofte Amtssygehus, Frederiksberg Hospital, Denmark
P15. Power-Doppler analysis of tendon vascularity after ESWT in patellar and achilles tendinopathy.
K Peers, P Brys, R Lysens
University Hospitals Leuven, Belgium
P16. Predictors of human achilles tendon cross-sectional area.
P Hansen, H Hansen, J Bojsen-Møller, P Aagaard, M Kjaer, S P Magnusson
Bispebjerg Hospital, Copenhagen, Denmark
P17. Manual therapy in the treatment of sequelae after ankle distorsion. A presentation of two cases.
J Metner, B Lund
Skive, Århus amtssygehus, Aarhus University Hospital, Denmark
P18. Case report: Xanthomas of the achilles tendon, a differential diagnosis for tendinitis in athletes.
J L Olesen, A Hartkopp
Bispebjerg Hospital, Frederikssund Hospital, Copenhagen, Denmark
P20. 5 days of constant ankle taping indicates no reduction in sensomotor control on the untapped dominated ankle.
U Gudiksen, A Hedkmann, C Rosgaard, P Aagaard, P Magnusson, M Kjær, H Langberg
Bispebjerg Hospital, Copenhagen, Denmark
P21. Early functional rehabilitation versus conventional immobilization after surgical repair of achilles tendon rupture. Preliminary results.
T Ringstrøm, B W Jakobsen, L Bolvig, K K Pedersen, K Hougaard
Århus amtssygehus, Aarhus University Hospital, Denmark
P22. In vivo measurement of vastus lateralis tendon-aponeurosis stiffened - The influence of correction factors.
L R Rasmussen, J Bojsen-Møller, P Aagaard, P Magnusson, P Hansen, M Kjær, K Jørgensen
Bispebjerg Hospital, University of Copenhagen, Denmark

Biomechanics & physiology:

P23. Fatigue is major limiting factor for human performance both during sporting and exercises.
P Shekarchizadeh, J Karimian
Isfahan University, Iran
P24. Effects of growth hormone-administration on energy expenditure, fractional lipid oxidation and body composition.
R Morthorst, M Hansen, K H W Lange, A Flyvbjerg, H Ørskov, A Astrup, M Kjær
Bispebjerg Hospital, Copenhagen, Aarhus University Hospital, The Royal Veterinary and Agricultural University, Frederiksberg, Denmark
P25. Enhanced neural function after strength training: changes in evoked H-refleks and V-wave responses.
P Aagaard, E B Simonsen, J L Andersen, S P Magnusson, P Dyhre-Poulsen
Panum Institute, Copenhagen, Bispebjerg Hospital, Copenhagen, Denmark
P26. Cox-deficient muscle fibers in human creatine depletion - a novel finding.
K Peltola, H Kalimo, O Simell, K Näntö-Salonen, O J Heinonen
University of Turku, Finland
P27. Respiratory exchange ratio is elevated in human creatine depletion ?.
K Peltola, J Kapanen, O Simell, K Näntö-Salonen, O J Heinonen
Turku University Central Hospital, Finland
P28. Detraining subsequent to strength training induces faster intrinsic muscle contractile characteristics.
L Andersen, J L Andersen, C Suetta, L R Christensen, J L Madsen, K Klausen, P Aagaard
Bispebjerg Hospital, Copenhagen, Denmark
P29. Airway responsiveness to inhaled methacholine and exercise-induced bronchial response in male elite athletes.
L Pedersen, T Lund, B Larsson, B N Jensen, V Backer
Bispebjerg Hospital, University Hospital of Copenhagen, Denmark

Sport Injuries:

P30. The effect of Physiotherapeutic Intervention after Arthroscopic Knee Surgery
J Lorentzen, T Christiansen, B W Jakobsen
Århus amtssygehus, University Hospital of Aarhus, Denmark
P31. Repair of type-2 SLAP-lesions using corkscrew anchors. A clinical follow-up study.
J Kartus, C Kartus, H Brownlow, G Burrow, M Perko
Norra Älvsborg County Hospital, Trollhättan, Sweden, Orthopaedic and Sports Medicine Centre, Sydney, Australien
P32. The importance of kinetic programme in rehabilitation of elbow instability after epicondylitis.
Ligia Rusu-University of Craiova, Romania
P33. Eye injuries in floorball - a consecutive study.
C Swenson, Varberg Sjukhus, Sweden

Exercise & training:

P34. Abuse of anabolic androgenic steroids, growth hormones and erytropoietin reported in general practice.
D B Keld, T Hahn
Aarhus amtssygehus, Aarhus University Hospital, Denmark
P35. Treatment of complications to oil injections in muscles of the upper extremities.
I M J Hansen, F H Madsen, S E Christiansen, M Brodersen, N Egund
Aarhus University Hospital, Denmark
P36. Sport - and leisure activities after total hip arthroplasty.
L Sørensen, S Houshain, P W Kristensen, S Rasmussen
Vejle Hospital, Denmark
P37. Exercise per se does not increase serum PSA.
O H Heinonen, T Vasankari, P Koskinen, K Irjala
Turku University Hospital, Finland

POSTERWALK at Friday november 22nd, 16:30 - 18:00 ("Balcony")

Abstracts, oral presentations:

1.
STRATEGIES TO AVOID FOOTBALL INJURIES - A STUDY OF THE SWEDISH SUPER-LEAGUE DURING YEAR 2001.

Jan Ekstrand , MD, PhD, Professor, Martin Hägglund, PT, Markus Waldén, MD
Institution of Health, Linköping University, Sweden

The aim of this prospective cohort study was to evaluate medical strategies used by different teams and to generate hypotheses about methods to reduce injuries in professional football
Material and methods: The Swedish Super-league with 14 teams and 18-25 players in each team was studied during the football season (January-November) of 2001. All players on the first team lists in January were included. Mean age for the 310 players was 24 (17-38) years.
Each team kept attendance records for all training sessions and games (including games with national teams). The team doctors reported all injuries, which occurred during the study period. An injury was defined as any injury occurring during scheduled matches and training sessions and causing the player to miss at least one training session or game. Injuries were classified into 4 categories, according to severity. All injuries were recorded on a special card.
Results: Teams with few major injuries (absence > 1 month) had greater success as expressed by final points in the league play ($p<0.05$).
Some teams had medical strategies to avoid overuse injuries, to limit the number of major injuries and to reduce the number of re-injuries. These strategies and the effect of the strategies on injury rates and performance will be accounted for.
Conclusion: This observational study does not allow statements about causal relationship but the following hypotheses are generated:
* Teams that let players with pain rest from team training will sustain less major injuries
* Teams that devote the pre-season period for tissue strengthening will sustain less overuse injuries compared to teams using traditional ball-training exercises.
* Teams will sustain less re-injuries if they restrict injured players from matches until such players have trained fully with the team for one week without symptoms.
The hypotheses will be tested.

2.
HYPERMOBILITY IS NOT A PROBLEM IN MALE SOCCER

Per Hölmich, Maria Hansen, Pernille Weidemann, Jan Parner
Department of Orthopaedic surgery, Amager Hospital, 2300 Copenhagen S, Denmark

Introduction: It is a widespread theory that male soccer players are not hypermobile and if so they will have an increased risk of injuries especially to the joints. This theory might influence the diagnosis and advice given to athletes. The purpose of this study was to find the prevalence of hypermobility in male soccer and to evaluate if hypermobility represents an injury risk factor.
Material and Methods: 998 male adult soccer players were followed during an 8-month soccer season, after informed consent. Pre-season demographic information was collected and physiotherapists using Beightons hypermobility score examined all players. All injuries, injury mechanisms, types of injury and time lost from soccer were registered during the 8-month period.
Results: Using 4 of 9 Beighton-criteria the prevalence of hypermobility was 10.7% compared to 5% in the background population. The hypermobile players did NOT have more injuries than normals. The injury mechanisms and the types of injuries did not differ significantly from normals. We found a trend that more traumatic/acute injuries could be found among the hypermobile group, and more overuse injuries among the normals. No significantly different results were found using 5 of 9 Beighton criteria. Looking at athletes with hyperextension of the knees alone did not shown any significant differences in the number of knee injuries.
Conclusion: Hypermobility is common among male soccer players and it does not seem to be an injury risk factor.

3.
STRESS FRACTURES AMONG SWEDISH MIDDLE AND LONG DISTANCE RUNNERS

Jessica Bolgerth, RPT, Pia Thomeé, RPT, MSc, Roland Thomeé, RPT, PhD.
Lundberg Laboratory for Orthopaedic Research
Dept of Orthopaedics, Göteborg University, Sweden

Stress fractures are thought to be a common injury among physically active people. Track and field, especially middle and long distance running have shown to be among the most common sports affected. A stress fracture occurs when the repetitive strains and stress on the bone exceeds the skeletal possibility to remodulate. Examples of risk factors for stress fractures are training methods, footwear, anatomical abnormalities and low bone mineral density. The aim of this study was to investigate incidence of stress fractures among Swedish middle and long distance runners, and to describe eventual correlations between stress fractures and the amount of training. This retrospective survey included 120 elite runners in Swedish sport clubs. The selection was done from the official ranking list of the summer season year 2000. Athletes active in 800m, 1500m, 3000m steeplechase, 5000m, 10000m and marathon were included. Ten female and ten male athletes were included from each of the six distances. A questionnaire was sent out to the 120 runners. One hundred and four (104) of the runners responded to the survey, giving a participation rate of 87%. The results show a high frequency of stress fractures among Swedish elite runners. 26% (n=27) of the participants had suffered from a total of 40 stress fractures. The most common locations were the metatarsal bones and tibia. Female and male athletes were affected to the same degree. A significant correlation was found between stress fractures and the amount of training ($p<0.05$). However, no correlation was found between stress fractures and the different events. Furthermore, a significant correlation between the location of stress fractures and participation in either middle (800m, 1500m and 3000m steeplechase) or long distance (5000m, 10000m and marathon) running was found ($p<0.05$). Stress fractures are common injuries among Swedish elite middle and long distance runners. This survey shows a correlation between stress fractures and the amount of training. Furthermore, a correlation between the location of stress fractures and participation in either middle or long distance running was found.

4.
PRELIMINAR RESULTS AFTER REPAIR OF THE MEDIAL PATELLOFEMORAL LIGAMENT IN PRIMARY DISLOCATION OF THE PATELLA.

Christiansen SE, and Jakobsen BW
Division of Sports Trauma, Department of Orthopaedic Surgery, University Hospital of Aarhus, Denmark

Lateral dislocation of the patella will, conservatively treated, lead to disability due to anterior knee pain and instability/redislocations in between 30 and 50% of the patients (Ref 1,3,7). Pathologic changes are lesion of the medial patellofemoral ligament (appr. 90%), osteochondral lesions on the patella or on the lateral femoral condyle and lesion in the medial patellotibial ligament (appr. 55%) (ref. 1,3,7).
The purpose of this study is to evaluate the results after refixation of the medial patellofemoral ligament compared to nonoperative treatment in patients with acute primary dislocation.
The study was designed as a randomised study. Patients between 13 and 30 years with no prior history of patella disorders were included. Almost all patients had preop x-ray and were MR-scanned after a standard protocol. Further, all included patients were arthroscopically examinated before randomization to either operative or nonoperative treatment. The operative treatment consisted of a refixation of the medial patellofemoral ligament to the medial epicondyle.
All patiens had a Don-Joy hinged brace (0 - 20 degrees) for 2 weeks followed by an instruction in a rehabilitation program by a physiotherapist. 78 patients (between 13 and 30 years) has been included until now. Mean FU is 13 month. A two year follow-up time is scheduled. The results will be presented with respect to redislocation (endpoint) an a functional knee score. Further the results are stratified with respect to sulcus angle, patella alta, quadriceps angle and general laxity.

1. Salley,P.I. et al: Acute Dislocaton of the Patella, Acorrelative Pathoanatomic Study. Am.J. Sports Med., 24.1, 52-60, 1996.
2. Brattstrm,H.: Shape of the Intercondylar Groove Normally and in Recurrent Dislocation of the Patella. Acta Orthop.scand.(suppl) 68; 134-148,1964
3. Fulkerson,J.P. and Hungerford,D.S.: Disorders of the Patellofemoral Joint. 2nd Ed., Willians & Wilkins, Baltimore.
4. Virolainen,H et al.: Acute dislocation af the Patella: MR findings. Radiology. 189(1), 243 - 246, 1993.
5. Vainiopaa,S. et al.: Acute dislocation of the patella. A prospective review of operative treatment. J-Bone-Joint-Surg.,72(3)B, 366 - 369, 1990
6. Warren,L.F. and Marshall,J.L.: The Supporting Structures and Layers on the Medial Side of the Knee. J-Bone-Joint-Surg.61-A, 56-61,1979.
7. Hawkin,R.J. et al.: Acute patellar dislocation. The natural history. Am.J.Sports.Med, 14(2), 1986.
8. Winge,S. et al: Pathoanatomy of acute patellar dislocation; poster presentation, Dansk Ortopædisk Selskabs forårsmøde, Aarhus, 1997
9. Nikku,R. et al.: Operative Versus Closed Treatment of Primary Dislocation of the Patella. Acta Orthop. Scand.: 68.5, 419-423, 1997.
10. Maenpaa,H. et al.: Recurrence after Patellar Dislocation. Acta Orthop. Scand.: 68.5, 424-426,1997.

5.
RECONSTRUCTION OF THE POSTEROLATERAL CORNER. A NEW SURGICAL PROCEDURE.

Jakobsen BW, Lund B, Kjeldsen S and Christiansen SE.
Division of Sports Trauma, Department of Orthopaedic surgery, University Hospital of Aarhus, Denmark

Lesion of the popliteus fibular ligament and the popliteus tendon with or without rupture of the lateral collateral ligament is often referred to as lesion of the postero-lateral corner of the knee. The postero-lateral corner is involved in 4% of all knee-ligament injuries giving an incidence of less than 0.1 per 1.000 per year. Lesion of the postero-lateral corner is often related to either rupture of the anterior or posterior cruciate ligament.
Untreated lesion of the postero-lateral corner will lead to rotatory instability. Undiagnosed lesion can lead to failure of primary anterior cruciate ligament reconstruction. Primary repair with or without augmentation is recommended. In chronic cases stability should be established using an anatomic reconstruction.
Material: In the period from May 1997 to Jan 2001 51 patients with posterolateral instability were treated with primary repair with augmentation or reconstruction. Median age were 30 years, 29 were males. Chronic cases constituted 72,5% and 31.4% had previous surgery. Cause of injury were RTA in 35% and sport in 41%.
The concomitant ligament lesions were:
Isolated PLC/LCL: 6
PLC & ACL: 20
PLC & PCL: 15
PLC & ACL & PCL: 9
PLC & ACL & PCL & MCL: 1
Method: All had reconstruction of the lateral structures with a new procedure using hamstring grafts. Through a lateral hockey stick approach the proximal tibia and fibula were exposed as well as the anatomical insertion points of the lateral collateral ligament and the popliteus tendon at the femoral epicondyle. Drill-holes through head of fibula, proximal tibia and femur were done and a reconstruction of the lateral collateral and the popliteus tendon with semitendinosus and gracilis graft were performed. Concomitant ligament instability were treated with reconstrucion using either autografts or allografts.
All were evaluated with subjective assessment and objectively using KT1000 according to the IKDC form >12 months post-op.
Results: Preop 93% had > 10° lateral rotatory instability at 90° prone examination; postop all were stable (74% grade A, <5°; 26% grade B, 6-10°).
Conclusion: It can be concluded that significant PCL instability often is combined with PLC instability and non-diagnosed PLC instability concomitant to ACL instability may lead to ACL reconstruction failure. A 2 double bundle reconstruction of the LCL and PLC result in good objective stability with low complication risk.

6.
ULTRASONOGRAPHY IN THE PRE-OPERATIVE EVALUATION OF PATIENTS WITH RECURRENT ANTERIOR SHOULDER INSTABILITY.

Jon Karlsson MD, PhD, Peter Kälebo MD, PhD, Adad Baranto MD, Per Wiger MD, PhD, Olof Lundin MD, PhD
Department of Orthopaedics and Diagnostic Radiology, Sahlgrenska University Hospital, Göteborg, Sweden

Introduction: The purpose of this study was to evaluate the value of Ultrasonography (US) in the pre-operative evaluation of patients with recurrent anterior shoulder instability.
Patients and methods: Thirty-four consecutive patients with unilateral, recurrent instability of the shoulder were included in the study. An experienced radiologist examined all the patients, using a 7.5 MHZ transducer, with the arm in different positions, one of which was used to provoke apprehension of the shoulder. Special attention was paid to evaluation of the joint capsule, the anterior labrum, especially in terms of a Bankart lesion and the anterior ligament-capsular complex. All patients were subsequently operated on. In all patients an arthroscopy of the shoulder was performed, followed by either open or arthroscopic stabilisation of the shoulder.
Results: US disclosed an unstable anterior labrum (equivalent to a Bankart lesion) in 28 patients; the Bankart lesion was verified in all these patients during arthroscopy. In two patients, arthroscopy disclosed an injured labrum, which had healed in an anteriomedial position at the scapular neck. In these two cases, US failed to show any lesion. In four cases no Bankart lesion was found at arthroscopy, but increased shoulder laxity. In these cases, US did not show any Bankart lesion, however, a judgement of the joint capsule was not possible in these patients.
Conclusion: The principal finding of the present study was that US showed a high correlation with the arthroscopic findings. There were no false positive investigations and only a few false negative ones. The possibility to perform a dynamic investigation increased the usefulness of the US. It is concluded that US can give important pre-operative information in patients with recurrent, anterior shoulder instability. Further studies are, however, needed in order to be able to evaluate the joint capsule, labral injury, and the size of the ligament-labral injury.

7.
REVISITING THE OPEN BANKART EXPERIENCE IN A LONG-TERM FOLLOW-UP

Lennart Magnusson(1), Jüri Kartus(2), Lars Ejerhed(2), Ingrid Hultenheim(3), Ninni Sernert(2), Jon Karlsson(3)
1.Departments of Orthopaedics Köping Hospital, Köping, 2.Norra Älvsborg County Hospital, Trollhättan and 3.Sahlgrenska University Hospital, Göteborg.

Introduction: To make an unbiased long-term evaluation after open Bankart reconstruction.
Materials and methods: Fifty-four patients (54 shoulders) with symptomatic, recurrent, anterior post-traumatic shoulder instability were operated on using an open Bankart reconstruction procedure involving suture anchors. All the patients had a Bankart lesion. Forty seven/54 (87%) of the shoulders were re-examined by independent observers, after a mean follow-up period of 69 (48-114) months.
Results: The recurrence rate, including both dislocations and subluxations, was 8/47 (17%). The Rowe score was 90 (24-100) points at the follow-up and the Constant score was 88.5 (41-100) points. The external rotation in abduction was 90 (25-125)°, as compared with 97.5 (60-125)° for the non-injured shoulders ($p<0.0001$).
Discussion/Conclusion: In the long-term, the open Bankart procedure revealed an unexpectedly high number of patients with failure in terms of stability. The results of the present study emphasise the importance of performing unbiased long-term follow-up studies after surgical reconstruction of anterior, post-traumatic shoulder instability using any type of technique.

8.
RIB STRESS FRACTURES IN ELITE ROWERS: EMG AND 2-D VIDEO ANALYSIS.

A. Vinther(1,5), T. Alkjær(3), IL. Kanstrup(2), B. Larsson(4), S.P. Magnusson(4), P. Aagaard(4).
1.Dept Rehabilitation and Sports Medicine; 2.Dept of Clinical Physiology, Herlev Hospital, 3.Institute of Medical Anatomy, The Panum Institute; 4.Team Danmark Test Centre, Sports Medicine Research Unit, Bispebjerg Hospital; 5.University of Copenhagen. Department of Physical Therapy Lund University.

INTRODUCTION: Rowing technique and repeated high intensity contractions of thoracic muscles have been suggested to influence the development of rib stress fractures in elite rowers. Thus the purpose of the present study was to investigate selected movement patterns and activity in selected thoracic muscles during the rowing stroke.
MATERIALS AND METHODS: 12 national team rowers were examined: 6 with a history of repeated rib stress fractures (RSF) and 6 matched controls (C). Activation of m. serratus anterior (SA), m. obliquus externus abdominis (OEA) and m. trapezius (T) was quantified during ergometer rowing on basis of EMG analysis. Shoulder flexion angle and velocity of the ergometer seat and handle in the beginning of the drive phase were investigated using 2-D video analysis.
RESULTS: EMG activity in SA and T were significantly correlated to the increase in shoulder flexion angle in the initial drive phase ($r_s = 0.74$, $p<0.01$ and 0.58, $p<0.05$, respectively). Furthermore, the increase in shoulder flexion angle and the EMG activity in SA were correlated to the velocity of the handle in the beginning of the drive phase ($r_s = -0.70$, $p<0.05$ and -0.64, $p<0.05$, respectively). Higher velocity of the seat in the initial drive phase was observed in RSF subjects (RSF: 0.25 ± 0.03 ms^{-1} vs. C: 0.15 ± 0.06 ms^{-1} $p<0.05$) (Mean ± SEM).
DISCUSSION: The present results demonstrate a relationship between rowing technique and activation of m. serratus anterior and m. trapezius. A higher velocity of the ergometer seat in the early drive phase was observed in rowers with previous rib stress fractures. This movement pattern could give rise to elevated eccentric contraction forces in the thoracic muscles and increased costae stress forces, thereby contributing to the multifactorial etiology of rib stress fracture in rowing.

9.
DEFINITION OF A NEW H/Q RATIO BASED ON EXPLOSIVE MUSCLE STRENGTH

Mette K. Zebis(2), Michael Kjær(2), and Per Aagaard(1,2)
1. Team Danmark Test Centre, University of Copenhagen, 2. Sports Medicine Research Unit, Bispebjerg Hospital.

Introduction: A Hamstring/Quadriceps strength ratio based on maximal isometric rate of force development (RFD) is introduced in the present study. The rationale for this 'explosive' strength ratio is based on the notion, that the ability to rapidly reach a given level of antagonist-agonist muscle force in fast and explosive movements has important implications for in vivo knee joint function.
Material and methods: 16 female elite soccer players were tested for absolute and relative RFD H/Q ratio at end of match season (P1) and after 12 weeks of either isolated heavy resistance training (1.7 sessions/wk) (HRT) or detraining (CO). RFD was determined during maximal isometric quadriceps and hamstring contraction, both in fixed

time intervals (0-30, 0-50, 0-100, 0-200 ms) and when normalized to MVC (relative RFD at 1/6, 1/2 and 2/3 MVC).
Results: After 12 weeks of resistance training the HRT group experienced no change in RFD H/Q ratio. However, a significant decrease in RFD of the hamstrings was observed in the CO group ($p<0.05$) causing RFD H/Q ratio to decrease in time intervals 0-30 ms (32%) and 0-50 ms (27%) ($p<0.05$). The initial time interval (30-50 ms) showed the lowest RFD H/Q ratio values (0.29-0.36) compared to the latter intervals (100-200 ms: 0.43-0.45) ($p<0.05$). Relative RFD H/Q ratio approached unity (1.0) only at 2/3 MVC (>100 ms).
Conclusions: The RFD H/Q ratio indicates that the explosive strength capacity of the hamstring muscle is significantly reduced in the very initial (0-50 ms) contraction phase. This suggest that in the initial phase (0-50 ms) of explosive and forceful knee joint movements, the potential for muscular knee joint stabilization is impaired. The present study indicates that strength training can be effectively used to maintain or even increase RFD H/Q ratio in the detraining period from soccer.

10.
REPRODUCIBILITY OF JUMP HEIGHT, POWER- AND FORCE PARAMETERS DURING COUNTERMOVEMENT JUMPS

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Introduction: The ability to accurately assess improvement in physical performance following training is important with regard to elite athletes, as well as in sports medicine and rehabilitation. Muscular function is frequently evaluated using isokinetic or isometric procedures, although it involves movement patterns dissimilar to those of sports and/or daily life. However, as human movements often include a so-called stretch shortening cycle (SSC) where a concentric contraction is preceeded by an eccentric contraction, it may be desireable to quantify neuromuscular performance during such a movement task. The purpose of the present investigation was to evaluate the reproducibility of selected parameters of counter-movement jumping (CMJ).
Materials & methods: 15 subjects of different training status performed 6 CMJ's during standardized conditions on a force-platform. Three test rounds separated by 2-4 days were completed (1 familiarization day, day 2 and day 3). Jump height was determined by integration of the force signal, and the maximal jump height from day 2 and 3 was chosen from the 6 attempts. Reproducibility was investigated for jumping height, functional jump power, peak concentric- and eccentric force by calculating R^2 and CV for repeated measurements for attempts on day 2 and 3.
Results: Data are presented as means ±SD on day 2 and 3, for respective parameters: Jumping-height: 32.7±5.5cm, 33.0±5.8cm, R^2=0.97, CV=4.34%. Functional jump power: 2160±401W, 2235±432W, R^2=0.94, CV=4.83%. Peak concentric force: 1898±298N, 1952±330N, R^2=0.87, CV=4.16%. Peak eccentric force: 1888±337N, 1924±346N, R^2=0.88, CV=4.55%.
Discussion: The present data illustrate that CMJ's performed on a force platform yield reproducible data with respect to jump height, peak eccentric/concentric force and functional jump power, and because a SSC is included it may thus be considered a functional alternative to more conventional methods of quantifying neuromuscular function. Moreover, the reproducibility makes it an appropriate tool for evaluating the effects of various training programs aimed at improving performance and function.

11.
EFFECT OF ECCENTRIC TRAINING ON COLLAGEN SYNTHESIS RATE IN ELITE SOCCERPLAYERS WITH CHRONIC ACHILLES TENDINOSIS

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Introduction: It has been shown that carrying out a 12-week eccentric heavy resistance-training regime can cure runners suffering from chronic Achilles tendinosis. The mechanism behind the effectiveness of this treatment is unknown. The present study investigates the effect of an identical training regime on elite soccer players suffering from chronic Achilles tendinosis.
Methods: 15 elite male soccer players (Superliga to 3. division) participated in the study. Nine of who suffered from tendinosis (27±1 yrs) while 6 were healthy controls (22±1 yrs). All participants performed 12 weeks of heavy-resistance eccentric training, and continued playing soccer through out the study. Before and after the training periods an array of physiological parameters were measured including collagen metabolism using microdialysis, mechanical tendon properties using ultrasonography, and Achilles tendon anatomical cross sectional area (CSA) using MRI.
Results: The eccentric training resulted in subjective improvement and reduction in pain in the subjects suffering of a mild degree of tendinosis. After training an increased collagen synthesis was measured by microdialysis in the initially injured tendon (PICP: pre: 3.9 ± 2.5 µg/l to post: 19.7 ± 5.4 µg/l, $p < 0.05$). The collagen synthesis was unchanged in healthy tendons (PICP: pre 8.3 ± 5.2 µg/l to 11.5 ± 5.0 µg/l, $p > 0.05$). Collagen degradation measured as ICTP was not affected by training neither in the injured tendons nor in the healthy controls. CSA was 11 % smaller in injured tendons compared to healthy controls. CSA increased in injured tendons with training, and injured tendons was found to be 4 % smaller post training than healthy controls. Training did not increase CSA in healthy tendons. No changes were found in mechanical properties after training, neither in injured nor in healthy tendons.
Discussion: This study shows that chronically injured Achilles tendons have a smaller CSA compared to healthy controls. In addition mechanical loading performed as eccentric training for 12 weeks affects chronic injured Achilles tendons by increasing collagen synthesis rate, and thereby diminishing the differences in CSA. The collagen metabolism in healthy control tendons seems not to be affected by eccentric training. These findings could indicate a relation between collagen metabolism and "healing" of injured tendons.

12.
BALANCE AND INJURIES BEFORE AND AFTER 5 WEEKS OF ANKLE DISC TRAINING.

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Introduction: Several studies have demonstrated that young female players in European Handball have a very high injury incidence. Most of these injuries are preventable, and the injury odds ratio have been shown to be 4.8 for players not using an ankle disk.The causes of the injuries in European handball are largely unknown.
Our hypothesis is that the risk of injuries could be linked to inadequate balance.
To test this hypothesis a prospective randomised study examining balance before and after a period of 5 weeks of ankle disc training was set up, and all injuries were recorded.
Material and Methods: Forty-one female players, aged 15-18, participated in the study. Twenty two players performed an ankle disc program when practising (a total of 10-15 times), and 19 players practised as usual.
Measurements were performed with a Kistler platform, subjects were standing on both legs and on one leg only with eyes open in 30 seconds. The signals measured were analysed for 95% confidence ellipse, total sway length and sway velocity.
Injuries in games and training were registered during a period of 5 months. Because of a skewed distribution, data was transformed. ANCOVA was used to asses if any difference in change of balance between groups appeared. Exact-test was used to asses the difference in injury incidence.
Results: We found no significant relationship between ankle disk training and balance. But a significantly lower injury incidence was found in the intervention group ($p<0.0386$).
Perspective: Balance was not improved by the ankle disc program. This may be due to a relatively brief training period of 5 weeks with a total of 10-15 training bouts. On the other hand an effect on the injury incidence was found. One possible explanation could be a grounding effect, where the connection between the body and the surface improves. The training may also improve balance through training of the small, local, stabilizing muscles. Finally part of the effect may be psychological.

13.
THE ULTRASONOGRAPHIC APPEARANCE OF THE RUPTURES ACHILLES TENDON DURING HEALING. A longitudinal evaluation of surgical and non-surgical treatment, with comparisons with MRI appearance.

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Introduction: The controversy concerning the optimal treatment for Achilles tendon ruptures (ATR) has not been resolved and the healing process after the rupture is poorly understood. The present study is a prospective, randomised trial of ATR concerning the outcome after surgical and non-surgical treatment. The aim is to describe the healing characteristics after ATR, using Ultrasonography (US) and Magnetic Resonance Imaging (MRI), and to correlate the radiological findings with the clinical outcome parameters after treatment for complete rutpure. This is the first study that has used both US and MRI for a randomised comparison of two treatment groups in terms of tendon healing after ATR.
Patients and methods: Sixty-five patients were included in the study. Thirty-five patients with ATR underwent surgical treatment and 30 patients were treated non-surgically in a prospective, randomised trial. The groups were compared using US after six, 12 and 24 months and MRI after 12 months. A standardised protocol was used and the outcome was correlated with clinical findings.

Results: Common findings one year after the injury were tendon thickening and moderate heterogeneity of the tendon. Peritendinous reactions, edema and defects were only present in a minority of patients. There were no significant differences between the treatment groups in any of the evaluated parameters apart from the gliding function of the tendon, which was significantly reduced in the surgically-treated group compared with the non-surgically-treated group. No correlations were found between the radiological findings and the clinical parameters, such as muscle strength, endurance and range of motion.
Conclusion: We conclude that the roles of US and MRI during the healing process after ATR are limited. Although radiological abnormalities in our imaging protocol still exist one to two years after treatment, they appear to have a weak correlation with the clinical outcome in the present study. When using US during the healing after ATR, no significant difference in the number of positive findings could be detected between the treatment groups. The MRI findings after one year correlated well with the US findings, but no significant correlation was found between clinical parameters and the number of positive radiological findings. However, the result with non-significant differences between the treatment groups is in accordance with previous findings relating to the clinical outcome after ATR in the population that does not sustain a re-rupture.

14.
CHANGES IN LOCAL AND SYSTEMIC IGFBPS IN RELATION TO LOCAL INDUCED TYPE I COLLAGEN SYNTHESIS AFTER DIFFERENT FORMS OF ACUTE EXERCISE

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Introduction: An increase in type I collagen synthesis in the peritendinous region of the Achilles tendon, has been measured with the microdialysis method, in response to acute running in humans. As insulin-like growth factor I (IGF-I) and its binding proteins (IGFBPs) can stimulate the synthesis of collagen, we wanted to determine IGF-I and IGFBPs *in vivo* in response to acute exercise and to correlate the obtained values with local collagen synthesis.
Methods: Two experiments were carried out. In experiment A, males (n=6) performed treadmill running for 60 min (12 km/h, 3% uphill). In experiment B, males (n=6) performed running for 180 min (12 km/h). Tissue levels of IGF-I IGFBPs, PICP and ICTP were measured from microdialysis tubes placed around the Achilles tendon, and circulating levels were determined from blood, both prior to and for 3 days following the exercise in both experiments
Results: In experiment A, local IGFBP-4 was significant increased 24 and 72 hours after exercise, as was local PICP after 72 hours. Experiment B demonstrated both local and systemic increase in IGFBP-1 post exercise, a systemic increase in IGFBP-4 immediately and 24 h after exercise, as well as a local increase in IGFBP-4 24 hours post exercise. Neither IGF-I nor other IGFBPs were changed.
Discussion: It was demonstrated that acute exercise was capable of increasing collagen synthesis and that *in vivo* measurement of connective tissue IGF-I and IGFBPs is possible. The change in IGFBP-1 only with longer exercise duration indicates, a dose dependent regulation of IGFBP-1 is response to changes in metabolic state. Likewise, IGFBP-4 responses to exercise can be related to the degree of inflammation occurring. It is hypothesized that changes in tissue IGFBPs causes a change in IGF-I availability and thus causes an indirect effect on the collagen synthesis in exercising humans.

15.
ESWT IN PATELLAR AND ACHILLES TENDINOPATHY: A DOUBLE-BLIND, PLACEBO CONTROLLED, RANDOMISED CLINICAL TRIAL.

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Introduction: Extracorporeal Shock Wave Therapy (ESWT) has been reported as a successful treatment for patellar and Achilles tendinopathy in uncontrolled studies. This study evaluates the short term effect of ESWT for chronic patellar and Achilles tendinopathy in a placebo controlled, double-blind randomised clinical trial.
Materials and Methods: Twenty-eight patients suffering from chronic patellar or Achilles tendinopathy were randomised to a placebo (P) or ESWT group (E). All patients had symptoms for more than three months, failed previous treatment (NSAID, relative rest, physiotherapy) and echographically documented tendinosis. Patients in group E received 3 sessions of 1000 focused shock waves (4 Hz, 0.2 mJ/mm^2) at one week interval. Patients in group P received a sham treatment. An eccentric exercise program was instructed to patients of both groups at 2 weeks post treatment. All patients were evaluated subjectively and functionally (VISA(A) questionnaire) before and 2 and 6 weeks after (sham)ESWT. There were no significant differences between subject characteristics of both groups (age, duration of symptoms, gender).
Results: Both groups showed significant improvement on VISA(A) score after 6 weeks. Two and six weeks after treatment the average VISA(A) score improvement for group E was significantly better than for group P (+17/+26 and +7/+13 respectively, P< 0.05). Subjective percentage of improvement was 36 and 21 after 2 weeks and 50 and 31 after 6 weeks for group E and P respectively. There where no significant differences between both groups in the functional progress using eccentric exercises from 2 to 6 weeks after (sham)ESWT.
Conclusion: In this double-blinded, placebo controlled trial, ESWT demonstrated to be effective in reducing pain and improving functionality for chronic patellar and Achilles tendinopathy. ESWT did not influence the functional progress made through eccentric exercising.

16.
IONTOPHORESIS WITH OR WITHOUT DEXAMETHAZONE IN THE TREATMENT OF ACUTE ACHILLES TENDON PAIN

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The purpose of this double-blind study was to evaluate the effects of iontophoresis with dexamethazone to iontophoresis with saline solution on patients who had acute (less than three months) pain from the Achilles tendon, in terms of range of motion, muscular endurance, pain and
symptoms. Twenty-five patients (15 men and 10 women), aged between 18 and 76 years (mean=38), were evaluated before and after two weeks of treatment with iontophoresis, as well as after six weeks, three and six months and one year. Two groups were treated for two weeks with iontophoresis: for each treatment, three millilitres of dexamethazone were used for the experiment
group (n=14) and three millilitres of saline solution for the control group (n=11). Both groups then followed the same rehabilitation programme for 10 weeks. Good reliability was found for the toe-raise and range of motion tests. Poor reliability was, however, found for the pain on palpation test, which was therefore excluded. No difference was found between or within groups for the toe-raise-test. Several significant improvements were seen in the experiment group but not in the control group with use of iontophoresis with saline solution, in the range of motion test, pain during and after physical activity, pain during walking and walking up and down stairs, morning stiffness and tendon swelling. Even though the small sample size limits the possibilities to draw definite conclusions, we conclude from the present study, using a double-blind, randomised approach and a one-year follow-up period, that positive effects from using iontophoresis with dexamethazone were found in the treatment of patients with acute Achilles tendon pain.

17.
TREATMENT WITH ECCENTRIC OVERLOAD FOR PATIENTS WITH CHRONIC PAIN FROM THE ACHILLES TENDON - A PROSPECTIVE, RANDOMISED AND CONTROLLED STUDY, WITH RELIABILITY TESTING OF THE EVALUATING METHODS

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The purpose was to examine reliability of measurement techniques and evaluate the effect of a treatment protocol including eccentric overload for patients with chronic pain from the Achilles tendon. Thirty-two patients with proximal achillodynia (totally 44 involved Achilles tendons) participated in tests for reliability measures. No significant differences and strong (r=0.56-0.72) or very strong (r=0.90-0.93) correlations were found between pre-tests, except for the documentation of pain at rest (p<0.008, r=0.45). To evaluate the effect of a 12 week treatment protocol for patients with chronic proximal achillodynia (pain longer than three months) 40 patients (totally 57 involved Achilles tendons) with a mean age of 45 years (range 19-77) were randomised into an experiment group (n=22) and a control group (n=18). Evaluations were performed after six weeks of treatment and after three and six months. The evaluations (including the pre-tests), performed by a physical therapist unaware of the group the patients belonged to, consisted of a questionnaire, a range of
motion test, a jumping test, a toe-raise test, a pain on palpation test and pain evaluation during jumping, toe-raises and at rest. A follow-up was also performed after one year. There were no significant differences between groups at any of the evaluations, except for that the experiment group jumped significantly lower than the control group at the six-week evaluation. There was, however, an over-all better result for the experiment group with significant improvements (not seen in the control group) in plantar flexion, pain on palpation, number of patients having pain during walking, having times when asymptomatic and having swollen Achilles tendon, compared with before treatment. Furthermore, there was significantly more patients at the one-year follow-up in the experiment group, compared with the control group, that were satisfied with their present physical activity level, considered themselves fully recovered, and had no pain during or after physical activity. The measurement techniques and the

treatment protocol with eccentric overload used in the present study can be recommended for patients with chronic pain from the Achilles tendon.

18.
PATIENTS´ USE OF A DIARY AS A TOOL FOR PERSONAL REFLECTION AND AS A COMMUNICATION TOOL

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Introduction: The aim of this PhD project was to: develop a concept for movement learning in physiotherapy, which delimits a theoretical understanding of practice where the theme's 'space', 'relations', 'intentionality' and 'reflection' are in focus; develop and carry out practical experiments with the practical implication of the concept and; on the basis of the empirical material and with the use of theoretical perspectives elucidate the meaning of the four themes in relation to the patients´ learning processes. The project explores amongst others the meaning of the patients´ use of diaries as a communication and a reflection tool.
Material and method: The project is a casestudy with action research as the scientific theoretical basis.
Four groups of patients with knee injuries and one group of with back pain problems have participated, each for 2 1/2 months training. Data materiel is diaries, observations by a non-participant observer, focus-group interviews. Theoretical perspectives from G. Bateson are used for analyzing the meaning of patients´ using diary.
Results and Conclusion: The diary is useful for the patients especially in the beginning of their rehabilitation period; when they are having problems in their rehabilitation; later when something turns out differently than expected by the patient. It is useful as a means of communicating with the physical therapist. In that way they get the possibility of presenting concrete problems and of having an influence on practice. They also find it useful for reflecting on their own reactions and problems, and for remembering concrete activities. The short 'narratives' in the diaries gives the physical therapist a possibility to be aware of different important aspects and is an important support in creating a practise that is influenced by the patients and reflects their needs.

19.
WHY DO PATIENTS WITH AN ACL-TEAR CHOOSE SURGICAL TREATMENT?

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Introduction: Most patients with ACL–tears are treated surgically, but the rational for that is not fully clear. The aim of the study is to evaluate why ACL–deficient patients choose surgical treatment.
Material and Methods: Seventy-three patients (age 18–50) with an acute ACL–tear are being followed prospectively for three years. Only patients that had not already chosen surgical treatment, five weeks post injury were included in the study.
Patients who were subjected to surgery after being included in the study were given a questionnaire in which they gave and rank-ordered reasons for choosing surgery. The top three reasons were included in the analysis.
Results: Six months post injury 19/73 (26 %) patients had been subjected to surgery and twelve months post injury 29/73 (40 %) patients had been subjected to surgery. Thirty-eight of 73 (52%) patients have so far chosen surgical treatment.
Patients with pre injury Tegner 8–10 chose surgery more often and earlier than patients with Tegner 4–7 ($p = 0.01$). Patients in the age group 18–30 chose surgery more often and earlier than patients in the age group 31–50 ($p = 0.05$).
Thirty-six of 38 (95%) patients have responded to the questionnaire concerning reasons for surgery. The most common reasons for surgery were: Instability with giving-way (47%); Inability to perform pre injury activities (47%); Patients' perception that they wouldn't be able to perform pre injury activities (33%); Recommendation from a doctor (31%); Recommendation from an acquaintance (28%); Fear for future problems e.g. osteoarthrosis (25%).
Discussion/Conclusion: Only 56% of the patients gave the reasons "Instability with giving-way" and/or "Inability to perform pre injury activities" more than 6 months post injury. The other patients, 44% gave other, in our opinion, less significant reasons.

20.
Acute Growth Hormone administration increases fat mobilisation but not fat oxidation during moderate intensity bicycling

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Introduction: The effects of acute growth hormone (GH) administration on metabolism during subsequent exercise are not known. We studied effects of GH administration on fat and carbohydrate metabolism during rest and bicycling in a randomised, double-blinded, crossover design.
Material and Methods: Seven highly trained men (age: 25±5 yr (mean (SD), VO_{2peak}: 62±3 ml O_2 • min^{-1} • kg^{-1}) performed 120 min bicycling (Ex) at 55% VO_{2peak} 4 h after receiving 7.5 IU (2.5 mg) GH or placebo (plc). Control studies (Rest) included the same dose of GH/plc followed by rest. In all studies a standardized meal was given 2h after the GH/plc injection.
Results: GH administration resulted in minor increases in circulating glycerol in the resting studies (GH 14% vs. Plc –48%, $p<0.0001$). When combined with exercise the increase in glycerol was very pronounced (GH 716% vs. Plc 328%, $p<0.0001$). However, this increased fat mobilisation did not result in a detectable increase in whole body fat utilization (indirect calorimetry). Furthermore, GH administration resulted in a small, but significant increase in circulating lactate (Rest: $p<0.05$, EX: $p<0.0001$). In addition, plasma glucose concentration was significantly higher after GH administration during Rest ($p<0.01$) and in combination with exercise (EX, $p<0.01$).
Conclusion : We conclude that a single GH-dose had an exaggerated increase in lipolytic effect both at rest and during exercise in humans. Despite the higher fatty acid availability after GH injection whole body substrate utilization during exercise did not change significantly.

21.
POSTOPERATIVE HEAVY-RESISTANCE STRENGTH TRAINING INCREASES EXPLOSIVE MUSCLE FORCE IN ELDERLY PATIENTS

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Introduction: The ability to rapidly produce contractile force (0-200 ms) has thought to have important functional consequences for athletes as well as elderly individuals. Therefore, the present study examined the effect of various training regimes following hip replacement surgery on explosive muscle force (Rate of Force Development: RFD).
Material & methods: Twenty-six patients (60-86 yrs) scheduled for unilateral hip replacement due to arthrosis were randomised to a 12 week rehabilitation program consisting of either; 1) Heavy-resistance training (3/wk • 12 wks), 2) Electrical stimulation (1h/day • 12 wks) or 3) Physiotherapy (1/wk • 12 wks). The non-operated side did not receive any intervention and thereby served as a within-subject control. Maximal isometric quadriceps strength (KinCom), contractile RFD (ΔForce/ΔTime) and impulse ($\int$Force dt) was measured pre-surgery, 5 wks and 12 wks post-surgery. Non-parametric tests were used for statistical analyses (significance level $p \leq 0.05$).
Results: In the heavy-resistance training group significant changes was observed in isometric strength (25%, $p<0.01$), contractile RFD at 50 ms (34%, $p\leq0.05$), 100 ms (26%, $p<0.01$) and 200 ms (27%, $p<0.02$) after the onset of contraction. Furthermore contractile impulse increased at 100 ms (27%, $p<0.02$) and 200 ms (27%, $p<0.01$). No changes was seen in the two other training groups nor in the non-operated legs of all three groups.
Conclusion: The present data indicate that in contrast to traditional physiotherapy and electrical stimulation, heavy-resistance strength training increases isometric strength and muscle force in the early phase of contraction. This improvement in explosive muscle strength (RFD) following hip replacement surgery may have important functional implications for the elderly patient.

22.
EFFECT OF PREEXHAUSTION EXERCISE ON LOWER EXTREMITY MUSCLE ACTIVATION DURING A LEG PRESS EXERCISE

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Introduction: The purpose of this study was to investigate the effect of preexhaustion exercise on lower extremity muscle activation during a leg press exercise. Preexhaustion exercise, a technique frequently used by weight trainers, involves combining a single joint exercise immediately followed by a related multijoint exercise (e.g. a knee extension exercise followed by a leg press exercise).
Material and Methods: Seventeen healthy male subjects performed 1 set of a leg press exercise with and without preexhaustion exercise, which consisted of 1 set of a knee extension exercise. Both exercises were performed at load of 10 repetition maximum (10RM). Electromyography (EMG) was recorded from the rectus femoris, vastus lateralis and gluteus maximus muscles simultaneously during the leg press exercise. The number of repetitions of the leg press exercise performed by subjects with and without

preexhaustion exercise was also documented. The activation of the rectus femoris and the vastus lateralis muscles during the leg press exercise was significantly less when subjects were preexhausted ($p<0.05$).
Results: No significant EMG change was observed for the gluteus maximus muscle. When in a preexhausted state, subjects performed significantly ($p<0.001$) less repetitions of the leg press exercise.
Discussion/Conclusion: Our findings do not support the popular belief of weight trainers that performing preexhaustion exercise is more effective in order to enhance muscle activity compared with regular weight training. Conversely, preexhaustion exercise may have disadvantageous effects on performance, such as decreased muscle activity and reduction in strength, during multijoint exercise.

23.
BALANCE BEFORE AND AFTER SHORT ANAROBIC AND INTERMITTENT EXERCISE

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Introduction: Studies have shown that young female players in European handball has a very high injury incidence. The causes of the injuries in European handball are largely unknown. One cause could be inadequate balance due to fatigue. A study for examining balance before and after both short anaerobic and intermittent exercise was set up, to investigate the development in balance after fatigue that is common during matches.
Material and Methods: Forty-one female players, age 15-18, participated in the study. Balance was measured before exercise, after three 30 m all out sprints and after an intermittent shuttel-run test. Measurements were performed with a Kistler platform, subjects were standing on both legs and on one leg only with eyes open in 30 seconds. The signals measured were analysed for 95% confidence ellipse, total sway length and sway velocity.
Because of a skewed distribution, data was transformed. Regression adjusted for hours of practice per week and the cluster sampling, was used to asses the difference in balance between before and after exercise.
Results: Balance significantly deteriorated after both short anaerobic and intermittent exercise ($p=0.002$), when measured on two legs. Measurements on one leg showed no significant differences.
Perspective: Deterioration of balance during and after long aerobic exercise was expected, but the significant deterioration of balance after 3 short bursts of sprint was quite unexpected. The missing difference before and after exercise on one leg could be due to restitution from the muscle fatigue and large inter and intra individual differences.
The 3 short bursts are equivalent of 2 quick breaking attacks and one quick return for defence in between, indicating an increasing risk of injury after a normal running pattern during a match. This could be one of the explanations of the high injury incidence of young female handball players.

24.
PHYSICAL ACTIVITY IN ADOLESCENCE AND IN ADULTHOOD AND INHERITED CHARACTERISTICS AS PREDICTORS OF BLOOD PRESSURE

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Introduction: Part of the association between physical activity and low blood pressure may be a consequence of genetic selection. We investigated genetic factors and physical activity in adolescence and adulthood as predictors of blood pressure.
Material and methods: Finger arterial blood pressure was measured in standard conditions as a 5 minute average with a Finapres device in 70 monozygotic and 75 dizygotic male twins, who were free from diabetes and used no antihypertensive or other cardiovascular medication. The subjects lifetime exercise and other health habits were interviewed. Exercise was classified as aerobic, power or other, and these were divided into adolescence (12-20 years of age), the previous year, and lifetime. Height, weight and body-fat content of the subjects were measured. Mean age of the subjects was 49.0 years (range 35-70). The associations between the independent variables and blood pressure were analysed by regression analysis. Genetic modelling to estimate genetic and environmental components of variance was made for significant exercise variables.
Results: Lifetime and adolescence aerobic exercise and coffee drinking were inversely related to both systolic and diastolic blood pressure, while also smoking was inversely related to systolic pressure. Exercise in adolescence explained 6%, lifetime exercise 2% and genes 21-25% of the variation in diastolic pressure. Correspondingly, exercise in adolescence explained 1% and genes 33% of the variation in systolic pressure. Other exercise variables were not associated with blood pressure. The genetic factors underlying blood pressure and those underlying exercise in adolescence were correlated ($rg=-0.63$ for diastolic pressure, $rg=-0.29$ for systolic pressure).
Discussion: Aerobic exercise in adolescence being associated with blood pressure in adulthood is a new finding, as is the observation that the factors partly share the same genes. The possibility of preventing hypertension in middle age with aerobic exercise in adolescence should be investigated.

25.
STRENGTH TRAINING INDUCES LONG-LASTING NEURAL ADAPTATION DURING MAXIMAL ECCENTRIC MUSCLE CONTRACTION

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During maximal eccentric muscle contraction, significant neural inhibition appears to be present in sedentary subjects. Although heavy-resistance strength training has been shown to increase eccentric muscle strength, less is known about the adaptative change in eccentric strength induced by detraining.
Purpose: To examine neural adaptation mechanisms that influence the expression of maximal eccentric muscle strength in response to strength training and detraining.
Methods: Muscle strength was measured as maximal concentric and eccentric isokinetic knee extensor moment (Kin-Com, 30 and 240°s^{-1}) in 13 young sedentary males, before and after 14 weeks of heavy-resistance strength training (38 sessions) and after 14 weeks of detraining (= no training). Simultaneous surface EMG signals were recorded in the quadriceps muscle (VL, VM, RF) to determine the degree of neuromuscular activation at each respective contraction mode and velocity (Aagaard et al. 2000). Anatomical cross sectional area (CSA) of the quadriceps muscle was determined by magnetic resonance imaging (MRI).
Results: Maximal eccentric muscle strength and neuromuscular activation at the slow contraction velocity increased 53 % and 46-61 %, respectively, with strength training ($P<0.05$). Muscle CSA increased 10 % ($P<0.01$). After 14 weeks of detraining maximal muscle strength and neuromuscular activation were largely preserved during eccentric contractions, in contrast to concentric contractions, in spite of muscular atrophy.
Conclusions: The present findings suggest that heavy-resistance strength training induces long-lasting neural adaptations and strength gains during eccentric but not concentric muscle contraction.

26.
A TWO-TO-TEN YEAR FOLLOW-UP OF ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION IN 999 PATIENTS, WITH A NORMAL CONTRALATERAL KNEE

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Introduction: To make an assessment of the outcome after anterior cruciate ligament (ACL) reconstruction in a very large group of patients.
Materials and methods: 999 patients (343 female, 656 male) with a symptomatic unilateral ACL rupture, who underwent arthroscopic reconstruction using patellar tendon autograft and interference screw fixation at three Swedish hospitals were included in the study. The age of the patients at the time of the index operation was 26 (14-53) years. The patients were operated on 12 (1-360) months after the index injury. The follow-up examinations were performed by independent physiotherapists after 32 (20-117) months.
Results: 573/999 (57%) patients underwent meniscal surgery before, during or after the ACL reconstruction. The Tegner activity level was 8 (2-10) pre-injury, 3 (0-9) preoperatively and 6 (1-10) at follow-up ($p<0.0001$, pre-op v follow-up). At follow-up, the Lysholm score was 90 (14-100) points, the KT-1000 anterior side-to-side knee laxity difference was 1 (minus 6-13) mm and the one-leg-hop test was 95 (0-167)% of the contralateral normal side. At follow-up, 68% of the patients were classified as normal (Group A) or nearly normal (Group B) according to the IKDC system, and 37% of the patients were unable or had severe problems to walk on their knees. During the follow-up period, 24% of the patients required some kind of additional surgery in the reconstructed knee.
Discussion/Conclusion: Overall the results after arthroscopic ACL reconstruction using patellar tendon autograft were good. At follow-up a considerable number of patients had, however, problems walking on their knees. In spite of high Lysholm score values in the majority of the patients, and only 1 mm side-to-side difference of knee laxity, the median reduction of activity level was two levels on the Tegner scale. Furthermore, a considerable number of patients underwent additional surgery during the follow-up period.

27.
A SHORT- AND MIDDLE TERM FOLLOW-UP AFTER ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Introduction: The aim of this study was to assess and compare the short (1-2 years) and middle term (4-6 years) results after arthroscopic anterior cruciate ligament (ACL) reconstruction.
Material and methods: Between 1991 and 1992, 54 patients with a unilateral ACL rupture underwent arthroscopic reconstruction at Köping Hospital using all-inside technique and bone-patellar tendon-bone autograft 11 (0-203) months after the injury. At 19 (12-28) months after the reconstruction all patients underwent a follow-up examination by an independent observer. A second follow-up examination was performed on 49/54 (91%) patients 56 (41-71) months after the reconstruction.
Results: The Lysholm knee scoring scale score and the Lysholm pain subscore were significantly lower at the second follow-up compared with the first ($p<0.001$ respectively). No significant differences between the first and second follow-up were found in terms of the Tegner activity scale and one-leg-hop test. Using the manual Lachman test 52/53 (98%) of the patients were classified as 0 or +1 at the first follow-up. The corresponding number at the second follow-up was 45/49 (92%). At the second follow-up 24/49 (48%) of the patients were classified as normal or nearly normal according to the IKDC evaluation system. The KT-1000 total side-to-side difference at the second follow-up was 1.0 (minus 6-7.5) mm. Between the index operation and the second follow-up 15/49 (31%) patients underwent additional surgery due to loss of motion, pain near the tibial fixation site, meniscal symptoms or re-rupture of the ACL.
Discussion/conclusion: The results 4-6 years after ACL reconstruction were good in terms of subjective, objective and functional outcome. The Lysholm knee scoring scale showed a significant decrease over time. This might be caused by an increase of pain in the knee. Furthermore, a considerable number of patients underwent additional surgery between the index operation and the second follow-up.

28.
THE STRAIN ON THE ACL DURING FOUR DIFFERENT CLOSED KINETIK CHAIN EXERCISES – AN IN-VIVO STUDY

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Introduction: A variety of Closed Kinetic Chain (CKC) exercises are used in the postoperative rehabilitation after an anterior cruciate ligament (ACL) reconstruction. The objective of this investigation was to measure the ACL strains produced during four commonly prescribed CKC exercises following ACL reconstruction; the step-up, the step-down, the lunge and the one legged sit to stand.
Material and Methods: Nine subjects with normal ACLs who were candidates for arthroscopic meniscectomy under local anaesthesia volunteered for this study. Displacement measurements of the antero-medial bundle of the ACL were measured using a DVRT (Differential Variable Reluctance Transducer). The DVRT was artroscopically applied to the ACL before three repetitions of each exercise was performed in a random order. Strain on the ACL and the knee flexion angle was then recorded.
Results: No significant difference were found in peak strain values due to different exercises. The average peak strain values were 2.5 % for the step-up, 2.4 % for the-step down, 1.1 % for the lunge and 2.2 % for the one legged sit to stand. The individual relationship between knee angle and strain was clear and verified by Spearman correlation coefficient. However, the data between subjects was highly variable.
Discussion/Conclusion: This study shows that the step-up, the step-down, the lunge and the one legged sit to stand do not produce greater strains on the ACL than earlier in-vivo studies have shown during the traditional two-legged squat. They could therefore be used, similarly to the squat, in ACL rehabilitation if not performed near full knee joint extension.

29.
RECONSTRUCTION OF THE ANTERIOR CRUCIATE LIGAMENT IN CHILDREN AND SKELETAL IMMATURE ADOLESCENTS

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Lesion of the anterior cruciate ligament in children and immature adolecents will often, treated concervatively, result in a poor knee function with severe degenerative changes in the following decades. Reconstruction of the anterior cruciate ligament in this group of patients has been under much debate due to the risk of disturbance of the epiphysis, resulting in bony bridging, angular deformity or leg length discrepancy (ref.4).
However, several reports (ref.1-3) have during the last 5 years, described good and excellent results after reconstruction of the ACL in younger children (Tanner I-II) with significant growth potential.
In the period from 010197 - 311201 we operated 45 children and adolescents (mean age 13 y, range 8 - 15) with ACL lesions. Mechanism of injury was almost sports associated trauma (soccer, handball, basketball and skiing). Sex-ratio (27 girls/18 boys) was atypical compared to other reports (ref. 1) , but might be due to high ratio of female handball players in Denmark. 40% had concominant lesions, (meniscal tears, medial collateral ligament and chondral lesions). 1 patient was not included in this material due to multiple ligament injury (acl, pcl and mcl).
Group 1.: Of special interest were 10 skeletally immature patients (age 8 - 13y, mean 11y, Tanner I+II) with radiographically „wide"open growth plates treated by intra-articular reconstruction using soft-tissue autografts (hamstrings with femoral endobutton fixation and screw/spiked washer
fixation on the tibia-side). Trans-epiphyseal technique was used in both tibia and femur. Accurate graft-sizing and equivalent drilling (min 0,5 mm interval) is optimal. In this group (FU. 22 m) Lysholm improved from 49 until 93, and KT-1000 (25 deg flexion, 30 lbs) improved, decreased from 8,2 mm until 0,8 mm laxity. No growth disturbance was seen.
Group 2.: 21 adolescents (age 14 -15y, mean 14,5, Tanner III) with open physes were treated operatively with soft-tissue autografts whereas the remaining (group 3.) 7 patients (Tanner IV) approaching skeletal maturity were reconstructed with patellar bone-tendon-bone technique.
Group 4.: 6 children had avulsion fractures at the tibiaplateau. 4 of these patients had displacement were > 2 mm and were treated operatively with cerclage-wire fixation through 2 drillholes in the tibia epiphysis.
The overall results were (FU 28 m): No growthplate disturbances were seen in any groups. Mean Lysholm score improved from 61 preop. to 92 postop. The KT-1000 analysis improved from 7 mm to 1 mm laxity (Lachman, 25 flex, 30 lbs). The overall functional outcome was good except in one girl (Tanner group IV) who sustained of instability grade I - II and Pivot shift grade I.
In group I one, a 10 years old boy had an excellent result and returned to sport (soccer and skiing) but 11 month after primary reconstruction he had a new knee trauma resulting in graft-rupture. A revision has been performed (feb.2002).

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30.
HOME BASED REHABILITATION AFTER ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Introduction: In reviewing the literature there is no evidence that all patients having an ACL-reconstruction must carry out the same controlled rehabilitation programme. In view of this we have changed the rehabilitation after an ACL-reconstruction. All patients with an estimated low risc of rehabilitation complications were allocated to a home based rehabilitation programme supervised by a physiotherapist with 6 consultations during the first 3 months after operation. This study is an evaluation of the first 12 months with a supervised self-rehabilitation programme.
Material and methods: 355 ACL-reconstructed patients were referred to the department of physiotherapy. 20 patients dropped out, as they had address in another county. Patients suitable for home based rehabilitation were selected according to the following criteria:
- age 18 years and above
- an isolated ACL-reconstruction
- +/- meniscal resection
- +/- traumatical cartilage lesions
- first time revision of the ACL-reconstruction

Status of 2 weeks post.op. examination:
- passive flexion min. 90°

- passive extension to 0°
- activate the VMO and use it in the gait phase
- be able to do home exercises on their own

At set intervals of 2 weeks the patients were seen and tested by a physiotherapist. If the patient fullfilled a number of predecided milestones further training modalities were introduced. If the patient did not comply with the criteria the patient was transformed to traditional rehab protocol with numerous visits to the physiotherapy.
Results: 247 patients fullfilled the inclusion criteria for home based rehabilitation and had from 5 - 9 visits to the physiotherapy. 88 patients were allocated to traditional rehabilitation in the physiotherapy due to: age < 18 years, meniscal refixation, osteoarthritis, lack of extension, no VMO activation, pain and not coping with home practice. Some of the patients receiving intensive rehabilitation in the initial stages could later on cope with home based training.
Conclusion: 247 (70%) patients were able to rehab in a home based programme according to the defined criteria. 88 patients were excluded during the rehab period due to the above mentioned criteria.

31.
REHABILITATION OF ACL-DEFICIENT PATIENTS: EFFECT OF HEAVY RESISTANCE TRAINING AND PROTEIN SUPPLEMENTATION

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Introduction: Especially quadriceps muscle of the ACL-injured leg is exposed to severe atrophy due to disuse after injury. Rehabilitation training of ACL-deficient patients offered at most hospitals is often not sufficient to fully recover muscle mass and strength during the training period. In this study we determined whether muscle mass and strength could be improved by additional heavy resistance training (HRT), and whether this effect was enhanced by protein supplementation.
Material and Methods: In this study, 17 subjects, mean(±SD) age 25±5 years, with unilateral ACL-injury for 15±13 months conducted 36 bouts of thigh strengthening HRT sessions during 12 weeks. Subjects were randomly distributed into three groups each assigned to ingest one of three supplementations immediately after each training session: 1) Protein+Carbohydrate (PC), 2) Isocaloric Carbohydrate (CARB), 3) Non-calorie Placebo (NON). 2h before and 2h after each training session subjects were not allowed to ingest any other nutrients.
Results: Mean 3 repetition maximum (RM) strength in leg-press exercise at the ACL-injured leg increased ($p<0,05$) by over 90% when all subjects were pooled, whereas isokinetic and isometric strength did not change over time ($p>0,05$). Anatomical Cross-Sectional Area (ACSA) of quadriceps determined by MRI increased significantly at distal, mid and proximal thigh by 32% ($p<0,05$ – significant larger than all other increases), 19% and 15% in PC-group, respectively, 18%, 13% and 12% in CARB-group, and 13%, 12% and 11% in NON-group.
Conclusion: This study demonstrates that strengthening of quadriceps in an ACL-deficient leg is pronounced when patients are subjected to HRT. The training effect on muscle mass in the distal thigh was significantly more enhanced if combined with protein supplementation compared to only carbohydrate or placebo. To obtain highest possible gain in muscle mass, intake of protein is recommendable immediately after each heavy resistance exercise session in patients with ACL-deficiency.

32.
HAMSTRING STRAIN INJURY IN ELITE SOCCER PLAYERS: VISCOELASTIC RESPONSE, RFD AND H/Q STRENGTH RATIO

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Introduction: It is unknown if muscle strength and tightness contribute to hamstring strain injuries. Therefore the present study examined if difference existed in hamstring/quadriceps ratio (H/Q), Rate of Force Development (RFD) and passive viscoelastic muscle characteristics in hamstring injured (HI) and non-injured control (C) elite soccer players.
Material and Methods: Professional HI (n=8) and C (n=8) soccer players were tested for maximum concentric and eccentric hamstring and quadriceps strength (KinCom; 30 and 240°/s). Further, contractile RFD (0-200 ms) was measured during maximal isometric contractions. RFD H/Q ratios were calculated based on absolute and relative RFD, and contractile impulse. Viscoelastic response of the hamstrings was measured during passive knee extension. Parametric test were used for statistical analysis.
Results: Conventional concentric H/Q ratio at 240 °/s based on peak moment (PM) (C: 0.70±0.03, HI: 0.59±0.02), moment at 40° (C: 0.85±0.04, HI: 0.68± 0.05), and moment at 30° (C: 0.72±0.04, HI: 0.56±0.05) differed ($p<0.05$). Conventional eccentric H/Q ratio based on PM (C: 0.61±0.03, HI: 0.50±0.04) differed ($p<0.05$). Functional H_{ecc}/Q_{con} ratio at 240 °/s based on PM (C: 1.28±0.07, HI: 1.01±0.10) and 50° moments (C: 1.23±0.07, HI: 0.90±0.08) also differed ($p<0.01$). RFD H/Q ratio based on absolute RFD tended to differ ($p=0.10$-0.16) at 30 ms (C: 0.43 ± 0.09; HI: 0.27 ± 0.06), 50 ms (C: 0.39 ± 0.07; HI: 0.25 ± 0.05) and 100 ms (C: 0.44 ± 0.04; HI: 0.35 ± 0.04). Passive viscoelastic hamstring responses were not different between HI and C.
Conclusions: The present study showed that conventional and functional H/Q ratio is reduced in HI soccer players, indicating a substantial deficit in maximal hamstring muscle strength, especially during fast eccentric contraction. No significant differences emerged in passive viscoelastic response of the hamstrings, indicating that muscle tightness itself is not a governing factor in hamstring strain injury.

33.
ACTIVATION OF SATELLITE-CELLS AND REMODELING OF THE EXTRACELLULAR-MATRIX AFTER A BOUT OF ECCENTRIC-EXERCISE

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Introduction: Chronic eccentric mechanical loading to muscle is hypothesized to induce muscle hypertrophy via a disruption to cytoskeletal proteins, inducing the release of growth factors from within the damaged myofibres. This mechanism however has not been shown in *in vivo* human studies. The aim of this study was to identify alterations I the cytoskeletal proteins and the extra cellular matrix (ECM) and to assess the activation of satellite cells after a single bout of intense eccentric exercise.
Methods: Eight untrained males (22 – 30 yrs) performed 210 maximum eccentric contractions utilizing an isokinetic dynamometer on one leg only, the contra-lateral leg acted s the control. Muscle biopsy and microdialysis samples were obtained from the vastus lateralis muscle of the exercising and control leg immediately following the exercise bout and 2, 4, and 8 days post-exercise.
Results: Satellite cell activation was observed 2 days post-exercise in the microdialysate sample taken from the exercising leg only, with a gradual increase in the expression of fetal antigen 1 to day 8 after the exercising bout. No alteration in the staining pattern of desmin, dystrophin or fibronectin was observed in any biopsy taken in 7 of 8 subjects tested. Despite this a remodeling within the ECM was noted with an increase in staining of pro-collagen peptide type 1 and tenascin-C, which commenced at day 2 post exercise and was maintained until day 8 post exercise.
Discussion: In this study we show that after a single bout of high intensity quiescent satellite cells. This activation was not precipitated by gross cellular damage to the cytoskeletal proteins however was accompanied by a remodeling of the surrounding ECM. We therefore hypothesized that the ECM plays a much greater role in muscle adaptation to physiological exercise than previously believed.

34.
EXPOSURE OF THE ADOLESCENT PORCINE SPINE TO MECHANICAL FLEXION-COMPRESSION AND EXTENSION-COMPRESSION.

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Introduction: In several studies it has been shown that the adolescent spine is vulnerable to trauma and especially so are the vertebral growth zones. In athletes, participating in sports with high demands on the back, it has been found a high frequency of abnormalities affecting the intervertebral discs, the vertebral endplates and the vertebral ring apophyses. The aetiology of these abnormalities is still a controversy issue. The aim of this study was to find an explanation to the mechanism behind traumatic displacement of the ring apophysis and to the disc degeneration seen in adolescent athletes. We have studied the effect of an experimental traumatic flexion-compression and extension-compression force on functional spinal units (FSU) from adolescent porcine lumbar spine. The biomechanical, radiological, magnetic resonance imaging (MRI) and histological characteristics are described.
Material and Methods: Sixteen functional lumbar spinal units (vertebra-disc-vertebra) obtained from 8 adolescent male porcine were used in the experiment. Eight FSU´s were exposed to flexion-compression and 8 FSU´s were exposed to extension-compression forces to failure. All units were examined with plain radiography and magnetic resonance imaging before and after flexion/extension compression. Thereafter, the units were sawed into 3-4 mm sagittal slices, photographed and examined histologically.
Results: In all FSU exposed to flexion-compression there were identical traumatic avulsion fractures seen in the growth zone posteriorly and in the extension-compression units anteriorly. No abnormalities were found in the discs. The injuries were not

seen on plain radiographs but were detected on MRI and confirmed on macroscopic, microscopic and histological examination. The flexion and extension angels at failure varied between 12° and 19°.
Discussion/conclusion: Previous experimental studies have shown that the growing spine is vulnerable for compression. Furthermore, several studies have shown a higher frequency of radiological abnormalities in the athletes when compared to non-athletes. The present study shows that the weakest part of the growing porcine lumbar spine, when compressed into flexion or extension, is the growth zone. As the human vertebra do not have the bony endplate, as the porcine vertebra, this location of weakness in the growth zone may explain the frequency of disc degeneration and persisting apophysis seen in the spine of athletes.

35.
RESPIRATORY SYMPTOMS AND LUNG FUNCTION IN MALE ATHLETES

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Introduction: The aims were to determine the prevalence of respiratory symptoms and asthma among elite athletes from three different sports, and to compare differences in symptoms and lung function with normal control subjects. Furthermore to search for any difference in the prevalence of respiratory symptoms in high/low training periods.
Materials and methods: Sixty-two male elite athletes (19 cyclists, 24 ice-hockey players and 19 swimmers) went through the following investigations twice (high- and low training periods): allergen skin prick test, maximal exercise test, lung function measurement, bronchial provocation with exercise and methacholine and a reversibility test. Furthermore, everybody had a personal interview and filled out questionnaires regarding respiratory symptoms and their sport. A matched control group (n = 14) not participating in competitive sport was examined once.
Results: The prevalence of respiratory symptoms among athletes (high training season) was 34% (interview) and 44% (self-administered questionnaires) (p=0.057), and 21% and 14% in controls, respectively (NS). Among athletes, 21% had current asthma (among controls 7% (NS)). Cyclist and swimmers showed better lung function compared to controls. Swimmers had superior lung function in comparison to all groups, and the highest prevalence of respiratory symptoms (42% by interview) and asthma (37%).
Conclusion: Elite sport causes development of respiratory symptoms and in some cases even asthma. In general all sports induce more or less the same irritation of the airways. Athletes have better lung function, of whom the swimmers are superior.

36.
CREATINE DEPLETED HUMANS HAVE NORMAL EXERCISE CAPACITY WITH HIGH OXYGEN CONSUMPTION DURING EXERCISE

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Introduction. The creatine (Cr)/ phosphocreatine (PCr) system is essential for buffering and transport of high-energy phosphates in muscle cell. Metabolic adaptation to Cr depletion has been studied in animal models only. Oxygen consumption (VO_2) at a given work rate level is reported to be higher in Cr depleted rats compared to normal controls. However, maximum oxygen uptake values (VO_{2max}) were within normal range.[1]
Gyrate atrophy of choroids and retina (GA) is a rare inborn error of amino acid metabolism. Patients with GA have 50 % PCr depletion in skeletal muscle, which provides a model of human Cr depletion *in vivo*. This is the first study on exercise capacity and oxygen consumption in human Cr depletion.
Methods. We measured VO_{2max} in 5 male patients (aged 19,33,41,47,49 years) with genetically verified GA and compared the results to 6 healthy age, gender and physical activity habits matched controls. VO_{2max} was determined by a continuous incremental test on an electrically braked cycle ergometer. The load was increased from 50 W by 30 W every 2 min until exhaustion. Direct O_2 and CO_2 analyses of respiratory gases (Medikro 202, Kuopio, Finland) were used. Theoretical VO_2 values were calculated according to ACSM.[2]
Results. VO_{2max} values (31–59 ml/min/kg) were within normal reference range for the age. Workload related oxygen uptake was higher in patients with GA when compared to theoretically calculated values. Oxygen consumption was also higher when compared to controls. (Figures to be presented).
Discussion. Despite chronic Cr depletion, the patients with GA had normal VO_{2max}. The interesting finding of elevated O_2 consumption during exercise is further studied.
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37.
INCREASED MUSCLE MASS WITH CREATINE, PROTEIN AND CARBOHYDRATE SUPPLEMENTATION

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Introduction: Dietary supplementation is thought to enhance the effect of strength training. Creatine supplementation has been shown to increase performance, body mass, and muscle size, and therefore a possible anabolic effect of creatine supplementation has been discussed.
Furthermore, early intake of protein supplementation after resistance training may enhance muscle growth. The aim of this study was to investigate the effects of creatine, protein and carbohydrate
supplementation on the adaptive changes in muscle size and muscle strength in response to heavy resistance strength training.
Material and Methods: 25 male subjects completed 16 weeks of heavy resistance strength training (3days/week) with focus on m. quadriceps femoris. Subjects were randomly assigned in a double-blind fashion to either a Creatine- (n=9), a Protein- (n=8) or a Carbohydrate (n=8) supplementation group. Maximal dynamic muscle strength (5RM, Knee extension), maximal isometric muscle strength (MVC, static knee extensor torque), whole muscle cross sectional area (Muscle CSA, MRI), and muscle fibre cross sectional area (Type 1 and Type 2 fibre area, Biopsi-samples) were measured before and after training.
Results: Muscle CSA and 5RM increased in all supplementation groups (7.2%, 3.8% and 7.1% versus 52.2%, 36.6% and 30.2%) for the Creatine-, Protein- and Carbohydrate group, respectively. In the Creatine group increases were found in MVC (24.6%), Type 2 fibre area (20.1%) and Type 1 fibre area (10.1%). Furthermore, Type 1 fibre area increased 8.2% in the Carbohydrate group.
Conclusion: The changes in muscle cross-sectional area and dynamic muscle strength with 16 weeks heavy-resistance strength training are in accordance with other studies. Creatine supplementation seems to augment the effects of training with reference to isometric strength and muscle fibre area.

38.
RISK ASSESSMENT IN TOP LEVEL FOOTBALL. A PROSPECTIVE INVESTIGATION OF THE SUPER-LEAGUES IN DENMARK AND SWEDEN

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The objective of the study was to compare exposure, injury risk and injury distribution in elite football in Sweden and Denmark.
Material and Methods: 14 teams in the Swedish top division and eight teams in the Danish top division were followed prospectively during the spring season (January û June) of 2001. Exposure to training and games were recorded for each player individually. All injuries that occurred during the study period were examined by the team medical staff. An injury was defined as any injury that occurred during training sessions or games causing the player to miss the next training session or game. The injuries were divided into four categories of severity.
Results: Swedish players had a greater exposure to training, whereas in games there was no difference between the countries. The injury risk was higher in Denmark during training (12 vs. 6 injuries/1000 hours, p<0.01), whereas in games there was no difference (28 vs. 26/1000). The risk of incurring a major injury (absence more than four weeks) was twice as high in Denmark compared to Sweden (1,8 vs. 0,7/1000, p<0.01). The injury distribution did not differ between Sweden and Denmark. One-third of the injuries were overuse injuries. One-third of the injuries were re-injuries with an identical injury within two months previously.
Conclusions: The players in Denmark were twice as likely to incur an injury during training and to incur a major injury. Seasonal variations may explain some, but not all, of the observed differences. There were a great number of overuse injuries and re-injuries in both Sweden and Denmark.

39.
ROLE OF TGF-SS IN RELATION TO EXERCISE-INDUCED LOCAL COLLAGEN SYNTHESIS IN HUMAN TENDINOUS TISSUE

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Introduction: Microdialysis studies have shown local increases in type I collagen synthesis in the Achilles' tendon region in response to both acute exercise and prolonged training. As Transforming growth factor-((TGF-() induces tendon fibroblast synthesis of type I collagen and is released from cultured fibroblasts in response to mechanical

loading, TGF-ß could link mechanical loading and collagen synthesis in tendinous tissue in vivo.
Materials and methods: Tissue levels of TGF-ß and type I collagen metabolism markers (PICP and ICTP) were measured by microdialysis in the peritendinous tissue of the Achilles' tendon in 6 male volunteers prior to and following treadmill running (1 h, 12 km/h, 3% uphill). In addition, blood levels of TGF-ß and PICP/ICTP were obtained.
Results: After exercise, a rise in tissue levels of PICP ($p<0.05$ at 68 h post vs pre) was seen. Tissue levels of TGF-ß were 30% higher 3 h post- vs pre-exercise without reaching significance (ns) and also plasma concentrations of TGF-ß rose 30% in response to exercise ($p<0.05$ vs pre).
Discussion/conclusion: Acute exercise results in increased local synthesis of type I collagen in human peritendinous tissue. Although not conclusive, changes in circulating and local (though insignificant) TGF-ß demonstrate a release of this cytokine in response to mechanical loading in vivo, and the time pattern is suggestive for a role of TGF-ß in regulation of local collagen type I synthesis in tendon related connective tissue subjected to mechanical loading.

40.
RESISTANCE-TRAINING IMPROVES MUSCLE STRENGTH, FUNCTIONAL LEVEL AND SELF-REPORTED HEALTH IN PATIENTS WITH CHRONIC PULMONARY DISEASE

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Introduction: Existing evidence suggests that inactivitycontribute to the reduced physical capacity in patients with chronic obstructive pulmonary disease (COPD). The purpose of this study was to investigate if resistance training could increase muscle mass, strength and leg extension power, and improve function and self-reported health in older males with COPD. Material and Methods: Home-dwelling male patients (65+ years) were recruited through the out-patient lung clinic. Baseline assessments included: Forced expiratory volume (FEV1), cross-sectional area of quadriceps (CSA), isokinetic strength in knee extensors/flexors (KES/KFS), leg extension power (LEP), maximal gait speed (MGS), stair-climbing time (ST), self-reported level of ADL (ADL) and health. The subjects were subsequently randomised to a resistance exercise group (RE, training twice weekly for 3 months) and a breathing exercise group (BE, control group) and assessments were repeated after 3 months.
Results: 6(RE) and 7 (BE) completed the project. No significant differences existed between the groups on inclusion. In RE the following parameters increased (pre to post, mean±SD): CSA 3571±439 to 3776±488 mm2, p=0.005), KES (64.7±19.5 to 76.2±20.2 Nm, p=0.013), LEP (19.7±6.1 to 23.0±6.6 W, p<0.0001), MGS (1.63±0.4 to 1.95±0.5 m/s, p=0.016), and ST improved (4.77±1.39 to 3.93±0.98 s, p=0.028). KFS and FEV1 did not improve in RE. In BG no improvements were found and FEV1 tended to decrease (p=0.058). The ADL level was significantly better in RE than in BE at 3 months i.e. walking 400 m (p=0.011), climbing stairs (p=0.011) and carrying 5 kg (p=0.048). Self-reported health improved in RE (p=0.046) and was significantly better than in BE at 3 months (p=0.035).
Conclusion: The improvements in strength, power and functional performance after 3 months resistance training were clinically relevant. Furthermore, resistance exercise resulted in a significantly improved perception of health and may slow down the decrease in FEV1 in elderly male patients with COPD.

41.
THE EFFECTS OF COMBINED ENDURANCE AND STRENGTH TRAINING ON RELEVANT PERFORMANCE PARAMETERS IN YOUNG COMPETITIVE CYCLISTS

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Introduction: The purpose of this study was to determine the effects of combined endurance and strength training on endurance performance of competitive male cyclists.
Methods: Fourteen subjects, aged 18-22 years, were assigned to either a concurrent endurance and strength training (ES; N = 7) or a endurance training only group (CON; N = 7). All subjects performed cycling training for four months (16-20 hours a week). In addition ES performed explosive strength training 2-3 times a week. Before (pre), immediately after (post) and two months after the training period (post2), all subjects completed a 5 min all-out test to determine peak oxygen consumption ($VO_{2\,max}$) and maximal workload ($watt_{max}$). In addition, endurance performance was assessed by average power output during a 45 min time trial test.
Results: After the four month training period fat free bodyweight increased ($p < 0.05$) in ES but not CON group ($p > 0.05$). Maximum isometric quadriceps strength (KinCom) increased ($p < 0.05$) in ES. ES also experienced a significant increase in endurance performance from pre to post and pre to post2 ($p < 0.05$) and performed significantly better than CON on this parameter in the post test when data was adjusted for body weight ($p < 0.01$). Endurance performance remained unaltered in CON. Following the period of training (post) ES performed significantly better than CON in the 5 min all-out test ($p < 0.05$). No significant changes was measured in $VO_{2\,max}$ in either of the groups.
Conclusions: The present findings suggest that combined endurance and strength training increases both short and long-term performance more than endurance training alone.

42.
CHANGES IN SHOULDER MUSCLE ACTIVITY DURING EXPERIMENTALLY INDUCED PAIN.

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Introduction: It has been suggested that pain in the musculoskeletal system influences muscle activity. However, changes in muscular activation during acute or chronic shoulder pain have not been clarified yet.
The aim of this study was to examine the effect of experimentally induced pain on the muscle activity of the shoulder muscles.
Materials and methods: Seven healthy young men (aged 22-27 years) without a history of current or previous shoulder injuries participated in the study. Wire electrodes were inserted into the supraspinatus and the infraspinatus and surface electrodes were placed over six superficially located shoulder muscles, for electromyographic (EMG) recordings.
After performing MVC's dynamic abductions and external rotations, the subjects were given a hypertonic saline injection in the supraspinatus to induce pain and thereafter the movements were repeated. Subjects were also given a hypertonic saline injection subacromially and performed the dynamic tests again. Pain intensity was measured on a visual analog scale (VAS) during the test movement.
Results: During dynamic abduction all the muscles, except the trapezius, showed higher EMG magnitude when pain was induced experimentally. The increased muscular activity was indifferent to the location of pain induction. When pain was induced subacromially and the subjects performed external rotation the muscles showed higher activity, than when the pain was induced in the supraspinatus.
Conclusion: The findings of this study demonstrated that experimental pain increased muscle activity during movements. This changed muscle activity indicates that pain has a strong influence on the motor function of the shoulder muscles during voluntary activity.

43.
FOUR WEEKS OF TAPING CAN IMPROVE SENSOMOTORIC CONTROL IN HEALTHY ANKLES

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Introduction: Use of external ankle support for stabilization of injured ligaments as for prophylactic purposes is very common in sports. Despite the extensive use of tape data on the effects of chronic taping on sensomotor control of the ankle is lacking. The aim of the present study was to investigate the effect of ankle taping on the sensomotoric control of the ankle in healthy soccer players.
Methods: 23 healthy young male soccer players with no history of ankle trauma during the previous 6 months participated in the study. 11 subjects (yrs) were in the experimental group and 12 in the control group (yrs). The subjects in the experimental group were taped (two heel-locks, four stirrups, two figure-of-eight) on the dominant foot before each training session and match for 4 weeks. Both the intervention group and the control group were tested on a force-plate before and after the intervention period. The test for sensomotor control consisted of measurements of movement of center of pressure during one-leg stance (modified Rhombergs test). Each subject were given three trails, and mean of the two best trails were used. The subjects were tested without their ankle taped.
Results: The study showed a significant effect of taping on the sensomotoric control of the ankles. The sway length was significantly reduced ($p = 0.007$) for the intervention group. The area of sway and the area of confidence ellipse were also significantly reduced ($p = 0.022$ and $p = 0.047$, respectively). No differences were found in the control group.
Discussion: In this study we show that taping of healthy ankles of 4 weeks improves the sensomotoric control of the ankle determined as sway length, area of sway and confidence ellipse area. These data are very promising as they point towards a positive effect of prophylactic taping improving sensomotoric control and thus improving postural control, balance and stability over the ankle joint. Based on the data one might suggest that even healthy ankles could be taped during situations with high risk of ankle trauma in order to prophylactic avert ankle distortions.

Abstracts, posters:

P1.
A LONG-TERM MRI-STUDY AFTER HARVESTING PATELLAR TENDON AUTOGRAFTS

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Introduction: The aim of the study was to make a long-term magnetic resonance imaging (MRI) study of the donor site after anterior cruciate ligament (ACL) reconstruction using ipsilateral, central third patellar tendon autografts.
Materials and methods: Nineteen consecutive patients aged 27 (16-43) years were included in the study. MRI examinations of the donor site were performed 6 (5-10) weeks, 6 (6-8) months, 27 (24-29) months and 71 (68-73) months postoperatively. The contralateral normal side was only examined at the first occasion.
Results: The size of the donor site gap decreased significantly (p=0.0001) between 6 weeks and 6 years after the harvesting procedure. The thickness of the patellar tendon at the donor site was increased compared with the contralateral healthy side until 2 years after the index operation (p=0.0004). However, the thickness decreased over time and was normalised at 6 years. The width of the patellar tendon at the donor site was increased compared with the contralateral side regardless of when the examination was performed (p<0.01), (Table 1).
Discussion/Conclusion: Prospective MRI examinations revealed that the patellar tendon at the donor site was not completely normalised 6 years after harvesting its central third. Therefore, re-harvest of a patellar tendon cannot be recommended when autograft tissue is needed e.g. in conjunction with revision ACL reconstruction.

P2.
IS THERE A DIFFERENCE IN LAXITY BETWEEN RIGHT AND LEFT KNEES? A prospective study of patients before and after anterior cruciate ligament reconstruction and of healthy controls

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Introduction: The aim of the study was to prospectively analyse and compare the anterior, total and side-to-side knee laxity in a group of patients with a right-sided anterior cruciate ligament (ACL) rupture and a group of patients with a left-sided ACL rupture before reconstruction and two years after reconstruction. Furthermore, to measure and analyse the anterior, total and side-to-side knee laxity between the right and left knees in a group of persons without any known knee problems.
Material and methods: Group A comprised 41 patients with a right-sided chronic ACL rupture, while Group B comprised 44 patients with a left-sided chronic ACL rupture. All patients underwent an arthroscopic ACL reconstruction using patellar tendon autograft. Group C comprised 35 persons without any known knee problems. One experienced physiotherapist performed all the KT-1000 measurements and the clinical examination.
Results: Group A displayed an increased difference in side-to-side laxity between the injured and non-injured side compared with Group B in terms of both anterior and total knee laxity. This difference was found to be statistically significant pre-operatively (p=0.01 anterior and p=0.001 total) and at the follow-up two years after the index operation (p=0.008 anterior and p=0.006 total). In Group C, there was a significant increase in absolute anterior and total laxity in the right knee compared with the left knee, when two repeated measurements were performed (p<0.0001 and p=0.003 anterior, p<0.0001 and p=0.001 total).
Discussion/conclusion: The KT-1000 arthrometer revealed significant increase in laxity measurements in right knees compared with left knees. This difference was found both pre- and postoperatively in patients undergoing ACL reconstruction. The same thing was found in a group of persons without any known knee problems.

P3.
BIOABSORBABLE INTERFERENCE SCREW SOCKET SHAPE COMPARISON USING 3-D MODELS

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Introduction: The major concern in the use of biodegradable ACL/PCL interference screws is the risk of screw breakage. The aim of this study was to use mathematical modelling for comparison of different cross-sections of screwdriver recesses.
Material and Methods: Three-dimensional (3-D) models were created of Linvatec BioScrew (socket shape: trilobe), Arthrex BioInterference (hexagonal), Smith & Nephew BioRCI (hexalobular six-star) and Inion Hexalon (hexalobular). Using a FEA (finite element analysis) torque loads were applied to various screw models representing the forces transmitted through the screwdriver to the screw.
Results: The highest maximum stress in the screw was observed for Arthrex-model (100 % = worst case). A stress for the Linvatec-model with the trilobe cross-section shape was 37 % of the Arthrex-model. The lowest stress was observed for the hexalobular cross-section shape, which is represented in the Smith & Nephew (13 %) and the Inion screws (14 %). A computational maximum displacement was used to quantify the tendency of the screwdriver to rotate inside the screw causing an increasing risk of failure at the driver-screw interface. The highest maximum displacement (100 % = worst case) was shown by the Arthrex-model. The percentage values compared to the Arthrex-model were 56 % for the S&N-model and 35 % for the Linvatec and Inion -models.
Discussion: The hexalobular cross-section (S&N and Inion) showed good results in both property comparison. The shape is superior in effectively reducing stress concentrations at the drive interface transferring the load to the screw body. The Arthrex-model with hexagonal socket shape was clearly weakest in both comparisons. FEA can be used for theoretical design comparison. In this study the same material parameters were used for all models. In the real use the screw material also appears significantly to affect screw strength.

P4.
CLINIC BASED REHABILITATION COMPARED TO HOME BASED REHABILITATION AFTER CRUCIATE LIGAMENT RECONSTRUCTION.

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Introduction: Several studies have been made concerning different rehabilitation programmes after anterior cruciate ligament reconstruction (ACL). The studies now focus on the effect of supervised clinic based rehabilitation compared to home based rehabilitation.
Material and method: The outcome of home based rehabilitation compared to clinic based rehabilitation was evaluated in a clinical, randomized, singleblinded trial. 8 patients completed the study (5 men, 3 women; average age: 31,4 years). 4 patients received home based physical therapy based on 4 visits to a psysiotherapist concerning guidance in appropriate exercises.
The patients subjective information of symptoms, pain, activity level and knee related quality of life were registered through AThe Knee Injury and Osteoarthritis Outcome Score@ (KOOS). The active and passive knee range of motion measured (goniometer) and the patients satisfaction concerning the course of rehabilitation were recorded on a Visual Analog Scale (VAS) before and after the intervention. Treatment time was also registered for both groups.
Results: No statistical significant difference were found in comparing the average improvements of the subscales symptoms, pain, ADL, and kneerelated quality of life (KOOS) - which was also the case concerning active knee flexion. The patients were all able to attain a minimum of 120 degrees of active knee flexion after the intervention. The difference between the control and intervention group concerning satisfaction with the course of rehabilitation was not statistical significant. All patients stated values equivalent or above 8 on the VAS scale. The time used for rehabilitation when comparing the 2 groups was not statistical significant, but the registered difference is of clinical importance. The average time used for each patient in the control group was 24,5 quarters of an hour against 13,8 for each patient in the intervention group.
Conclusion: This study showed no statistical significant difference between the clinic based and home based rehabilitation after anterior cruciate ligament reconstruction. Average time used for patients rehabilitated in a home based programme was 13,8 compared to 24,5 quarters of an hour for patients rehabilitated in a clinic based programme.

P5.
EARLY RESULTS AFTER ACL-RECONSTRUCTION USING HAMSTRING TENDONS FIXED WITH RCI-SCREWS®.

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Introduction: The forces in the normal ACL during activities of daily living (ADL) reaches 445 N (ref. 1), while biomechanical tests of hamstring grafts show lower pull-out forces, when fixed with titanium RCI-screws. Yet there are evidences, that failure

strength lower than 445 N do not interfere with the clinical results (ref. 1, 2). Since very few clinical investigations exist regarding RCI-screw fixation of hamstring tendons, we present our results after one-year follow-up.
Material and methods : In the period 1st of August 2000 – 28th of February 2001 27 patients underwent an ACL-reconstruction using quadrupled hamstring tendons fixed with RCI-screws in both tibia and femur. All patients were allowed immediate weight-bearing, full R.O.M. without braces, closed kinetic chain exercises after 6 weeks and return to pivoting sports after 8-9 months. Twenty-six were available for a clinical examination including IKDC-score and subjective measures using the KOOS-evaluation-form mean 11 months (range 9-13) after the operation.
Results: Twenty-two patients (85%) were graded "normal" or "nearly normal" according to the IKDC-score, and achieved satisfactory subjective measures (KOOS-score). In one of the 4 patients with "abnormal" knee function, a misplaced tibial tunnel was regarded as the cause. In the remaining 3 cases the operated knees were unstable with positive pivot-shift and significantly inferior subjective KOOS-score. In one of these cases the patient had sustained a new pivoting trauma.
Conclusion: In 22/25 (88%) of the cases with properly done ACL-reconstructions using hamstring tendons fixed with RCI-screws, stable knees and satisfactory subjective results were achieved after one year.
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P6.
THE EFFECT OF ACL SURGERY ON BONE MINERAL IN THE CALCANEUS. A PROSPECTIVE STUDY WITH A TWO YEAR FOLLOW-UP

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Introduction: The aim of the study was to evaluate the effect of anterior cruciate ligament (ACL) reconstruction on the bone mineral areal mass (BMA) in the calcaneus on the injured and non-injured side.
Methods: Thirty-four consecutive patients with a unilateral ACL rupture underwent arthroscopic reconstruction using patellar tendon autografts. The BMA was assessed bilaterally in the calcaneus using a (-camera according to the Dual-energy Photon Absorptiometry technique, before the operation and after six and 26 months.
Results: Thirty-one of thirty-four patients (20 men and 11 women) underwent all the BMA measurements. The median age at the index operation was 27 (16-50) years and the reconstruction was performed 12 (2-192) months after the injury. The median preoperative Tegner activity level increased from 3 (2-8) to 7 (2-9) at 26 months (p(0.0001). The BMA in the calcaneus on both the injured and non-injured side decreased by 16% and 17% respectively from the preoperative measurement to the 26-month control (p=0.0014, p=0.0006). On all occasions, the BMA was lower on the injured side than on the non-injured side (p=0.012).
Conclusions: Patients with a unilateral ACL rupture had a lower BMA in the calcaneus on the injured side compared with the non-injured side. Although the patients increased their activity level after the reconstruction, the BMA in the calcaneus decreased on both the injured and the non-injured side up to two years after the operation.

P7.
KNEE INJURY AND OSTEOARTHRITIS OUTCOME-SCORE (KOOS) ONE YEAR AFTER ACL-RECONSTRUCTION

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Introduction: Recently it has been stated, that surgeons rate knee outcome after ACL-reconstruction significantly better than the patients themselves (ref. 1), and attention therefore has been focused on the KOOS, which is patient-administered and assesses 5 outcomes after knee-surgery: Pain, symptoms, activities of daily living (ADL), sport and recreation function and knee-related quality of life (QOL). The KOOS has been shown to reveal expected correlations and validity, when compared to the Short-Form-36 and Lysholm score (ref. 2). Only very limited data is available regarding the KOOS-values after ACL-reconstruction (ref. 1, 2), and we therefore present our results after one year follow-up.
Material and methods: In the period 1st of August 2000 – 28th of February 2001 51 patients underwent an ACL-reconstruction, 27 with hamstring tendons (HT), 24 with patellar tendons (PT). Forty-six (26 HT, 20 PT) were available for a clinical examination including IKDC-score and KOOS-score mean 12 months (range 9-15) after the operation.
Results: Forty-one (22 HT, 19 PT) were graded "normal" or "nearly normal" according to the IKDC-score. The mean KOOS-scores for these 41 patients were : (100 points (maximum) indicates "no problems"):
ACL-reconstr. 12 months, KOOS,mean: Pain: 85,9; Symptoms: 82,9; ADL: 91,2; Sport: 68,5; QOL: 59,6
There were no differences in mean KOOS-scores among IKDC group A ("normal") and group B ("nearly normal"), but significantly lower mean-scores among the 5 patients in IKDC group C ("abnormal").
Conclusion: Our mean KOOS-scores one year after ACL-reconstruction is comparable with the latest published data (ref. 1). KOOS seems valuable in distinguishing between patients with acceptable and not-acceptable knee-function following ACL-reconstruction.
References:
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P8.
SURGICAL TREATMENT OF MEDIAL PLICA SYNDROM (MPS) AMONG ATHLETE

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Although most patients respond to conservative treatment (rest, ice bag etc.), Cortisone injection is helpful in around half of patients. Surgical excision gives an excellent result and raped recovery and returned to courts. Perspective study done over (46) patients whom pain and tenderness snapping and cord like stricture on the anteromedial aspect of knee joint. Arthroscopy done for all to exclude meniscus injery, and after diagnosis settled as (MPS), (all of them experienced conservative treatment plus minus cortisone injection). Surgical excision done for all of them with excellent result.

P9.
GROUP INFORMATION TO PATIENTS PREPARING FOR ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Introduction: Reconstruction of the anterior cruciate ligament (ACL) can be performed as an outpatient practice. To prepare the patients for this surgical procedure thorough information is necessary. To imply with the demands of a high information level and a high number of patients, this information can be done in groups. The aim of the study was to evaluate this group information.
Material and Method: 70 patients having had an ACL reconstruction as an out-patient procedure had a questionnaire to fill in and return anonymously. 53 patients answered the questionnaire.
All found the oral information acceptable or good (6/47); 51 found the written information good or acceptable (41/10); 51 felt well-informed and confident prior to surgery. 51 found the course of treatment coherent and well-organized.
Conclusion: It can be concluded that information in groups before ACL surgery results an acceble and good level of information giving the patients a feeling of confidence.

P10.
INTERACTIVE PATIENT INFORMATION BEFORE ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION

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Introduction: Reconstruction of the anterior cruciate ligament (ACL) is a major surgical procedure that has become a routine procedure in many sports clinics. In our institution ACL reconstruction is now performed as an out-patient procedure under general anesthetics. In this situation comprehensive information before surgery is necessary. The aim of this paper is to present a new information strategy using an interactive CD-rom, that is supplied to all patients preparing for ACL surgery.
Material and Method: In our institution more than 400 ACL reconstructions are performed per year. The majority are done as out-patient procedures. To prepare the patients for the surgery all have an ACL reconstruction information CD-rom handed out. Moreover all do have group information, individual examination and information by the surgeon, physiotherapist and anesthetist instruction 2 weeks prior to surgery.
The CD-rom contains an interactive information containing a video explaining the progress of the day of surgery, the plans for postop consultations and evaluations. Moreover the surgical procedure is demonstrated in animated drawings. The rehab.program is explained and shown in video sequences.
Comprehensive written information on risc, general results, type of graft etc are contained in the CD. The interactive CD rom information will be displayed in an E-poster.

P11.
PATELLOFEMORAL PAIN SYNDROME - PAIN, COPING STRATEGIES AND DEGREE OF WELL-BEING

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The purpose of this study was to evaluate how patients with patellofemoral pain syndrome (PFPS) experience their pain, what coping strategies for pain they use and their degree of well-being. Fifty patients, 15-52 years old, with PFPS were evaluated with Multidimensional Pain Inventory (MPI), Coping Strategies Questionnaire (CSQ) and Spielberger State Trait Anxiety Inventory (STAI). Reliability of the evaluation methods was established for 12 patients. Good reliability was established for all instruments except for six of the thirteen scales of the MPI. Results on MPI, CSQ and STAI are in agreement with the literature on other patient groups with chronic pain. The most frequently used strategies were Coping Self Statements and Ignoring Sensations. High scores were found for the strategy Catastrophizing compared with other patient groups having chronic pain. STAI scores were in general found to be somewhat higher than scores found in the literature on healthy subjects.
It is concluded that the way patients with PFPS experience their pain, the coping strategies for pain that they use and their degree of well-being, are in agreement with other patient groups who have chronic pain. Some concern is raised in terms of the high scores reported for the coping strategy Catastrophizing.

P12.
EFFECTS OF TRAINING ON MUSCLE FUNCTIONS IN TRAINED AND UNTRAINED INDIVIDUALS

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The purpose of this study was to examine the effects of training on muscle function in trained and untrained individuals. The hypothesis of the study was that individuals who were once trained are faster at improving muscle function than untrained individuals. To equalise the potential for improvement on muscle functions in the two groups the participating trained individuals were patients who had had injuries to their medial collateral ligament (MCL). During the recovery from the MCL injury the patients had been immobilised in a Don-Joy brace subsequently causing muscle atrophy in the lower extremity.
Five (5) individuals, two (2) trained (T) and three untrained (UT) participated in a four (4) week exercise program, training twice a week. During each training session the participants performed three training exercises for the lower extremities. The initial workload was set to 75% of 1-RM and was gradually increased according to individual progress. Unilateral measurements of isometric quadriceps strength, isometric quadriceps muscle endurance at 50%, quadriceps volume, subcutaneous fat of the thigh and muscle quality (MQ) of the quadriceps muscle were taken before and after training. Muscle strength increased significantly in the T-group ($p<0.01$) but not in the UT-group ($p=0.24$). MQ improved in all participants. No growth in quadriceps volume was found. These findings were interpreted as sign of improvements on muscle functions coming from enhancements in the neuromuscular function, not muscle hypertrophy. Due to the low number of participants in this study it was not plausible to make decisive conclusions as to the hypothesis of the study – therefore this study will serve as a pilot study for a future enhanced study.

P13.
EFFECTS OF OSTEOSET® BONE GRAFT SUBSTITUTE ON BONE HEALING IN HUMANS. A prospective randomized double blinded study in patients undergoing acl reconstruction

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Introduction: OsteoSet® (medical grade alpha-hemihydrate calcium sulfate) is known as a synthetic bone graft substitute. In this prospective randomized human trial we have investigated the effects of Osteoset® pellets on bone healing.
Materials and methods: 20 patients undergoing anterior cruciate ligament reconstruction were randomized in to groups with 10 in each. The study was designed as double-blinded trial. During the operation bone-patellar ligament-bone graft was prepared. The tibial defect in the active group was filled manually with Osteoset® pellets to the level of the cortical bone. No graft material was left in the control group. Computer tomography (CT) images of the defect were obtained the first day after the operation and at 6, 12 and 24 weeks. Clinical evaluation of the knee and VAS score registration were performed at the same time. Statistics: the data were analyzed using ANOVA on ranks and pairwisse multiple comparison procedures. The study was designed to show a difference of 70% between groups with a SD=50%, type I fault=5%, the type II fault=20%, $p<0.05$ was considered as statistical significant.
Results: All 20 patients completed the study. After 6 weeks CT showed significant reduction of the defect in both groups. No significant differences were shown between the groups at 6($p=0.055$), 12 and 24 weeks. It was not possible to distinguish remnants of pellets from the new bone on CTI at 6 weeks, whereas no pellets were visible after 12 weeks.
Discussion and Conclusion: In this randomized prospective study we found no effect of Osteoset® on bone healing in humans. However the rapid resorption of the pellets or limited efficacy of Osteoset®, because of insufficient contact between bone and pellets might explain it. Further investigations are indicated to find the best suitable bone substitute for humans.
Acknowledgment: Osteoset® was donated by Pro-meduc ApS, Denmark.

P14.
MANUAL DIAGNOSIS OF TALAR DYSFUNCTION AFTER INVERSION TRAUMA

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Background and purpose. The aim was to develop reliable manual tests to diagnose talar dysfunction after a ankle invertionstraume.
Subjects and methods. Fifty-eight participants (33 with ankle distortion) were examined by two blinded physiotherapists in two phases. An interim phase was conducted in which the manual tests was reassessed. The final manual test-program consisted of six manual tests, of which two are newly developed tests.
Results. The intratester reliability on the two new tests runs from 0.81 – 1.00 (Kappa coefficients). The intertester reliability of the two new tests runs from 0.35 – 0.48 (Kappa coefficients). The 33 participant with ankle injury were also offered ankle manipulation therapy. In the telephone follow-up 14 days after manipulation therapy, participants were asked whether their symptoms were worse, better or unchanged. Of the 33 participants with ankle injury 18 reported an improvement, whilst the remainder maintained that their symptoms were unchanged.
Discussion and conclusion. It was concluded that the manual test-program is moderately reliable. Manipulation therapy seems to affect the ankle symptoms positively.

P15.
POWER DOPPLER ANALYSIS OF TENDON VASCULARITY AFTER ESWT IN PATELLAR AND ACHILLES TENDINOPATHY

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Extracorporeal Shock Wave Therapy (ESWT) has recently been documented as a successful treatment for chronic tendinopathies. However, knowledge of its mode of action is fragmentary. It is hypothesised that ESWT increases intratendinous blood flow and consequently facilitates tendon healing. The aim of this study is to measure the effect of ESWT on the vascularity in chronic patellar and Achilles tendinopathy.
Material and methods: In 25 patients tendon vascularity was measured before and after each of three sessions of ESWT (1000 pulsations, 0.2 mJ/mm^2, 4 Hz). All patients had symptoms of patellar or Achilles tendinopathy for more than three months, failed previous treatment and echographically documented tendinosis. ESWT was echographically focused on the tendinosis zone. Tendon vascularity was quantified using surface measurement (mm^2) of coloured pixels on power Doppler echography (ATL HDI 5000, 12-5 MHz, PRF 1000 Hz).
Results: Two measurements were lost due to technical problems. In 73 tendons average intratendinous blood flow measured 13.2 mm^2 (SD: 20; 95%CI: 4) before ESWT and 13.9 mm^2 (SD: 20; 95%CI: 5) after ESWT. There is no significant difference between both measurements.
Conclusion: This study could not demonstrate a through power Doppler measurable effect of ESWT on tendon vascularity. This contradicts earlier presumptions and should make us reflect upon other modes of action for the clinical beneficial effects of ESWT.

P16.
PREDICTORS OF HUMAN ACHILLES TENDON CROSS-SECTIONAL AREA

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Introduction: It has been suggested that the human Achilles tendon operates within a narrow safety margin during sporting activities, and that the cross-sectional area (CSA) of the human Achilles tendon may increase with training which would serve to reduce tendon stress and risk of injury. However, it remains unknown to which degree loads during activities of daily living (ADL) determine tendon CSA. Therefore, the present study investigated the association between Achilles tendon CSA, body mass, height, BMI and maximal isometric plantarflexion force in young sedentary male subjects.
Materials & methods: MR-images were obtained 60 mm above the inferior margin of the calcaneus in young sedentary male subjects (n=10, age 29±3, mean±sd). Subjects performed three maximal isometric contractions against a steel plate attached to a strain gauge load cell, and the highest value was used for analysis. Tendon force was obtained by dividing maximal isometric joint moment by moment arm data from the MRI. Linear regressions were used to examine the strength of associations.
Results: Achilles tendon CSA was positively related to body mass (r^2=0.58, $p<0.05$), height, (r^2=0.60, $p<0.01$), and tendon force (r^2=0.79, $p<0.01$) but not to BMI (r^2=0.01). Tendon force was positively related to body mass (r^2=0.52). A multiple regression with CSA as the dependant variable and height, body mass, and plantarflexion force as predictors yielded R^2=0.90, $p<0.01$.
Conclusion: Tendon force, body mass and height could predict 90 % of the variation in Achilles tendon CSA in sedentary men. The relationships of body mass to plantarflexion strength and CSA suggests body mass may impose a load that increases muscle strength and tendon CSA.

P17.
MANUAL THERAPY IN THE TREATMENT OF SEQUELAE AFTER ANCLE DISTORSION. A PRESENTATION OF TWO CASES

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We present two cases with longlasting pain in the midfoot after distorsion trauma treated with manual therapy.
Case I: A 13 year-old boy with a trauma to the right foot in a soccermatch two years prior to the contact with the Sportstrauma Division, County Hospital in Århus. It was initally treated as an ankle sprain, but he continued to have pain during exercises and further sportsactivities were impossible. Was seen several times at local hospital and X-rays and MRI of the ankle showed no abnormalities.
Was then refered to *JM* and was treated with manipulation of os cuneiforme intermedius. There was a distinct snap and after the treatment he was able to run without pain and two days later he was able to participate in soccerpractices. At follow-up 4 months later he was still without any pain in the foot.
Case II: A 43 year old woman who had a skiing accident in January 2002. Twisted her left knee and ankle. Was seen at the Sportstrauma Division, County Hospital in Århus 8 weeks later because of the knee-injury. She mentioned a pain in the left foot as well as in the knee. She had a normal X-ray as well as pain over the ossis cuneiforme intermedius.
She was refered to *JM* and was treated with manual therapy and after the treatment she had no pain in the left foot. She was seen at follw-up 3 months later because of the knee and was still without any symptoms from the foot.
Discussion: The two cases we present have probably had an subluxation in the midfoot of the ossis cuneiforme intermedius even though we are unable to document it with X-rays or MRI.
In patients with persisting pain at midfoot level or at the anklejoint it might be possible to help them with manipulative therapy as seen in the photoseries attached.

P18.
CASE REPORT: XANTHOMAS OF THE ACHILLES TENDON, A DIFFERENTIAL DIAGNOSIS FOR TENDINITIS IN ATHLETES

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Achilles tendinitis is common among athletes. The physician must be aware of the differential diagnosis "Achilles tendon xanthomas" as it can mimic a tendinitis, and be the first clinical manifestation of familial hypercholesterolemia (FH) which requires lifelong medical treatment. A case report is presented of an 18 year old elite male handball player, in whom FH was diagnosed during treatment for Achilles tendinitis.
The patient was referred to a sports clinic with the diagnosis of severe bilateral Achilles tendinitis. The primary examination of the patient revealed a six-fold enlargement of the Achilles tendons, which had a disintegrated structure seen by ultrasonography. He had experienced pain from the area for several years with worsening symptoms the last months after intensification of running training. A local steriod treatment repeated three times the following two months was started together with eccentric training. This decreased the subjective symptoms from the tendons but was without significant objective improvement regarding swelling. As swelling of the finger joints also developed, a metabolic disorder was suspected. Blood samples obtained showed total cholesterol of 9,4 mmol/l and LDL of 6,7 mmol/l. Histological sections from needle biopsies from the tendons showed tendon tissue with xanthoma, which together with the elevated LDL and total cholesterol gave the diagnosis of familial hypercholesterolemia. The patient was started on a lifelong medical regimen with statins, which by restoring cholesterol levels towards normal, should decrease the existence of xanthomas.
Conclusion: The differential diagnosis of xanthoma should be known when treating Achilles tendinitis. The novel approach where a needle biopsy was obtained, confirmed the diagnosis of xanthomas of the tendons. A review of the litterature does not support surgical removal of xanthoma in Achilles tendon in athletes and an expectant treatment with medication is recommended.

P20.
5 DAYS OF CONSTANT ANKLE TAPING INDICATES NO REDUCTION IN SENSOMOTOR CONTROL ON THE UNTAPPED DOMINANT ANKLE

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Introduction: It is well known that sensomotor control immediately after application of ankle tape is augmented. However, it is unknown if the habitual use of ankle taping affects sensomotor control and thereby creates and physical dependence on the tape, in which the case the athlete should be informed about de-escalation of the use of tape. Therefore, the purpose of the present study was to examine the long-term effect of ankle tape on sensomotor control.
Material and Method: 19 female and 7 male healthy subjects (21-32 years of age) were strategically randomised to a control and experimental group. Subjects in the experimental group were constantly ankle taped on the dominant ankle (24 hrs/day) over a 5-day period with re-application of tape once every day. Both groups were physically inactive during the trial. Testing of sensomotor control (postural sway) was performed on a force platform. All tests were performed without ankle tape on the dominant ankle.
Results: 5 days of ankle taping show no significant change in postural sway as measured by the confidence elipse-area (p=0,92) and sway-area (p=0,86).
Discussion/conclusion: 5 days of constant ankle taping indicate no reduction of sensomotor control. This study, therefore, suggests that if ankle taping results in a significant effect on sensomotor control immediately after application it can be used prophylactic without later causing reduction of sensomotor control.

P21.
EARLY FUNCTIONAL REHABILITATION VERSUS CONVENTIONEL IMMOBILIZATION AFTER SURGICAL REPAIR OF ACHILLES TENDON RUPTURE. PRELIMINARY RESULTS

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Aim: To compare the two methods of treatment and reveal any differences regarding the clinical outcome, ultrasonographic appereances, elongation of the tendon and muscular strenght**.**
Material: From 01-04-01 to 15-04-02 38 patients, 18 women and 20 men. Mean age 42 (range 22 – 56). Mean follow-up 22 weeks (range 21-24).
Methods: After clinical diagnose, all had standard surgical procedure, suturing the tendon with a modified Kessler suture in local analgesia. Patients were randomizedn by envelope method postoperatively to either early functionel rehabilitation or conventionel immobilization. Clinical follow-up at 3 and 6/8 weeks. 22 weeks postop. ultrasonographic examination, x-ray and isokinetic testing were performed as well.
Results: No significant differences regarding any of the tests parameters. A non-significant shorter periode of sick leave in the functionel treated group, 24.5 days versus 47.5 days in the conventionel group. Complications included 1 rerupture in the conventionel group, 2 superficiel infections (1 in each group), 2 keloid reactions (1 in each group).
Discussion: Our results were in accordance with the results in the few other studys regarding functionel treatment. A shorter follow-up interval could possibly reveal differences between the groups regarding muscular strenght, but with no clinical consequences.
Conclusion: A bandage periode of 6 weeks allowing functionel exercises after surgical repair of Achilles tendon rupture did not increase the risc of re-rupture compared to standard immobilization in 8 weeks. The functional rehabilitation program implied a tendency to a shorter sick leave.

P22.
IN VIVO MEASUREMENT OF VASTUS LATERALIS TENDON-APONEUROSIS STIFFNESS – THE INFLUENCE OF CORRECTION FACTORS

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Introduction: Recent progress in technology regarding real-time ultrasonography (US), combined with the development of video tracking software has made it possible to visualise, track and quantify the displacement of the collagen-rich tissue within the intact muscle during isometric contraction. Previous studies have shown that small amounts of joint rotation is inevitable during isometric contractions. Furthermore, it has been proposed that antagonist co-activation in the hamstrings may cause a negative joint moment to be generated during maximal isometric knee-extension.
Purpose: 1) To improve on existing measurement methods by quantifying maximal displacement of the vastus lateralis aponeurosis *in vivo* including correcting for joint angular motion and elucidate whether antagonist co-activation affects the maximal isometric knee-extensor force. 2) Quantify the stiffness based on corrected force-displacement data.
Materials and methods: 9 males subjects performed two isometric knee extensions (10s ramp, 2 min apart). Knee extension force (corrected for antagonist co-activation), EMG, joint angle and real-time US video images of the aponeurosis displacement were sampled on-line. Stiffness was calculated from corrected force-deformation data between 50-90 % MVC.
Results: (mean(SD). Maximal displacement was significantly (p(0.005) reduced by ~10 % when it was corrected for knee-joint angular motion (11.7±0.007 mm vs.10.6±3.1 mm). MVC was found to increase significantly (p< 0.001) by ~5 % to when EMG derived antagonist co-activation was corrected for (6752±1240 N vs.7058±1140 N). Mean stiffness obtained in the 50-90 % range of the load-displacement relationship was 1321±477 N(mm^{-1} (range; 535-2082 N(mm^{-1}).
Conclusion: The present data suggests that the inclusion of an individual joint angle correction in combination with an individual correction for antagonist co-activation enhances the validity of the force and displacement measurements and subsequently stiffness data. This could partly explain the discrepancy in stiffness data between present and previous reports.

P23.
FATIGUE IS MAJOR LIMITING FACTOR FOR HUMAN PERFORMANCE BOTH DURING SPORTING AND EXERCISES

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The causes and consequences of fatigue during exercise fatigue is a major limiting factor for human performance both during sporting and exercises every day life.
The thermmoregulatory function of the hypothalamus may be immodulating sensations of fatigue through interaction between body core temperature perception.the main aim of the project is to examine the effect the thermmoregulatory function of the hypothalamus may be immodulating
sensations of fatigue through interaction between body core temperature perception.the main aim of the project is to examine the effect pperception and performance and will involve both physical cooling of selecte the use of sub stances that specifically activate cold receptors in the skin.

P25.
ENHANCED NEURAL FUNCTION AFTER STRENGTH TRAINING: CHANGES IN EVOKED H-REFLEX AND V-WAVE RESPONSES

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The Hoffmann (H) reflex can be used to assess spinal motoneuron excitability, while also reflecting the transmission efficiency (i.e. presynaptic inhibition) in Ia afferent synapses. Furthermore, evoked V-wave responses can be recorded in the muscle to estimate the magnitude of neural motor output from the motoneuron pool when activated via central descending pathways.
Purpose: To examine the adaptive change in neural motor function induced by resistance training by use of combined V-wave and H-reflex measurements.
Methods: Evoked H-reflex and V-wave responses were recorded in the soleus muscle in 14 male subjects before and after 14 weeks of heavy-resistance strength training (38 sessions). The H-reflex was superimposed onto maximal isometric plantar flexion by electrically stimulating the tibial nerve (1 ms square pulse) at an intensity that elicited a direct M-wave response of 20% M_{max}. In addition, n. tibialis was stimulated at supramaximal intensities during maximal isometric plantar flexion to elicit a short-latency V-wave response (V) and maximal M-wave (M_{max}). Muscle strength was measured as maximal concentric and eccentric isokinetic plantar-flexor moments (KinCom, 30°s^{-1}).
Results: The V-wave amplitude (V/M_{max}) increased from 0.308 ± 0.048 to 0.478 ± 0.034 mV with training (±SEM; p<0.01). M_{max} remained unchanged (10.78 ± 0.86, 10.21 ± 0.66 mV). The H-reflex amplitude increased from 5.37 ± 0.41 to 6.24 ± 0.49 mV (p<0.05). Maximal concentric and eccentric muscle strength increased from 112.2 ± 16.7 to 137.6 ± 10.8 Nm and 135.5 ± 18.6 to 175.6 ± 8.2 Nm, respectively (p<0.05).
Conclusions: Evoked V-wave and H-reflex responses increased following training (55% and 16%, respectively), indicating an enhanced motor output of spinal motoneurons during maximal voluntary muscle contraction. Taken together, these data indicate that the training induced increase in motoneuron output may involve both supraspinal and spinal adaptation mechanisms (i.e. increased central motor drive, elevated motoneuron excitability and/or reduced presynaptic inhibition).

P26.
COX-DEFICIENT MUSCLE FIBRES IN HUMAN CREATINE DEPLETION – A NOVEL FINDING

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Introduction. Cytochrome oxidase (COX) is the terminal complex of the mitochondrial respiratory chain and COX deficiency is a common cause of respiratory chain defects in humans.
Gyrate atrophy of choroid and retina (GA) is a rare inborn error of amino acid metabolism. Patients with GA have 50 % depletion of PCr in skeletal muscle, which provides a model of human Cr depletion *in vivo*. Muscle biopsy in GA is characterized by type II fiber atrophy and accumulation of tubular aggregates. We studied metabolic adaptation to human Cr depletion and report for the first time COX deficient muscle fibres in biopsies in patients with GA.
Methods. Muscle biopsies of 5 male patients with genetically verified GA (aged 19,33,41,47,49 years) were taken with Bergström needle from vastus lateralis muscle. Cryostat sections were double-stained for COX and succinate dehydrogenase.
Results. Biopsies from 4 patients showed the typical type II fiber atrophy and tubular aggregates. However, these were not detected in the youngest patient with 2 years of Cr supplementation. Interestingly, as a novel finding we found fibers with weak or absent COX activity in four biopsies (patients aged 19, 33, 47 and 49 years). The frequency of COX deficient fibres varied from 0.7 % to 1 %, which is a significant change.
Discussion. Ageing muscle is reported to show COX deficient fibres. Patients in this study were between 19 and 49 years of age and even the youngest patient showed COX deficient fibres. COX deficiency may be due to a mutation in a mitochondrial or a nuclear gene encoding COX subunit, mitochondrial mRNA or a nuclear gene instrumental in the biogenesis of COX.
To conclude, COX-deficient fibres in patients with GA having Cr depletion is a novel finding. It is tempting to speculate, that metabolic abnormalities such as high ornithine or low Cr concentration in mitochondria in GA may disturb mitochondrial gene expression or protein synthesis and cause a secondary COX deficiency.

P27.
RESPIRATORY EXCHANGE RATIO IS ELEVATED IN HUMAN CREATINE DEPLETION ?

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Introduction. The creatine (Cr)/ phosphocreatine (PCr) system is essential for buffering and transport of high-energy phosphates in muscle cell. Chronically Cr depleted animals show several mechanisms of metabolic adaptation in muscle, e.g. increased glucose utilisation and mitochodrial enzyme activity. (Wyss & Kaddurah-Daouk, Physiological Reviews 2000)
Gyrate atrophy of choroid and retina (GA) is a rare inborn error of amino acid metabolism. Patients with GA have 50% depletion of PCr in the skeletal muscle, which provides a model of human Cr depletion in vivo. Exercise metabolism has not been reported in human Cr depletion.
Methods. Respiratory exchange ratio (RER = CO_2 production / O_2 consumption) gives information on the exercise intensity and type and rate of fuel oxidation during exercise. We studied RER in 5 male patients (aged 19,33,41,47,49 years) with genetically verified GA. The results were compared to 6 healthy, age and physical activity habits matched male controls. A continuous incremental maximal aerobic power test was performed using an electrically braked cycle ergometer. The load was increased from 50 W by 30 W every 2 min until exhaustion. Direct O_2 and CO_2 analyses of respiratory gases (Medikro 202, Kuopio, Finland) were used during the test.
Results. Four patients with GA had higher RER values than controls throughout the exercise test (Figure to be presented). Interestingly, the CO2 production was unexpectedly higher in patients than in controls. One patient was on Cr supplementation

therapy, and his RER values were similar to those of the controls.
Discussion. In conclusion, this is the first report on RER in GA patients having Cr depletion. Elevated RER values found may be due to metabolic adaptation to possible energy depletion in skeletal muscle with low Cr.

P28.
DETRAINING SUBSEQUENT TO STRENGTH TRAINING INDUCES FASTER INTRINSIC MUSCLE CONTRACTILE CHARACTERISTICS

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Information in the literature is scarce, regarding the effect of a longer period of detraining subsequent to strength training on intrinsic muscle contractile characteristics.
Purpose: To examine the effect of detraining subsequent to strength training on evoked muscle twitch contractile characteristics.
Methods: Isometric twitch contractions were evoked on passive vastus lateralis muscle in 13 young sedentary males, before and after 14 weeks of heavy-resistance strength training (38 sessions) and after 14 weeks of detraining (= no training). Twitch rate of force development (tRFD) and time to peak tension (TPT) were determined from the twitch force-time curves. Furthermore, biopsy specimens were sampled from the vastus lateralis and analysed for MHC isoform composition according to procedures described recently (Andersen & Aagaard 2000).
Results: After 14 weeks of detraining faster evoked muscle twitch contractile characteristics, as reflected by 25 % faster tRFD ($p<0.01$) and 15 % faster TPT ($p<0.01$), were observed. These changes induced by detraining were seen along with a general shift towards a faster muscle MHC isoform composition (i.e. I (IIA and IIA (IIX). The increase in tRFD was positively correlated ($r=0.70$, $p<0.01$) to an increased proportion of MHC II (IIA + IIX).
Conclusions: The present findings suggest that detraining subsequent to strength training induces faster evoked muscle contractile characteristics as a result of a general shift towards faster MHC isoforms.

P29.
AIRWAY RESPONSIVENESS TO INHALED METHACHOLINE AND EXERCISE-INDUCED BRONCHIAL RESPONSE IN MALE ELITE ATHLETES

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Introduction: The purpose of this study was to determine the degree of airway responsiveness and exercise-induced bronchospasm in elite athletes and to study variations dependent on training status.
Material and Methods: Male elite cyclists (n = 19), ice hockey players (n = 24) and swimmers (n = 19) were studied during their peak training season and outside training season. At both periods they performed a methacholine challenge, an exercise challenge, filled in questionnaires, had their maximal oxygen consumption measured, and were interviewed concerning respiratory symptoms and use of asthma medication. Airway responsiveness to methacholine was evaluated using dose response slope (logDRS) and PD20 with a cut-off value of 8 µmol (AHR8). A control group (n = 14) consisting of males not participating in competitive sport was examined once.
Results: Both during and outside training season, the athletes had a significantly higher degree of airway responsiveness to methacholine expressed as logDRS than the controls ($p<0.05$). The airway responsiveness to methacholine showed a tendency towards rising during the athletes training season ($p=0.075$). Among the athletes, the swimmers had the highest logDRS values and furthermore, the swimmers demonstrated an increase in airway responsiveness during training season ($p<0.05$). There was no difference between athletes and controls in regard to exercise-induced bronchospasm (EIB). However, there was a correlation between EIB and airway responsiveness to methacholine during the athletes training season but not outside season. Athletes reporting one or more respiratory symptom had a higher frequency of AHR8 than athletes with no symptoms.
Conclusion: Elite athletes have a more severe degree of airway responsiveness than control subjects, and it seems that airway responsiveness increases during training season. Especially swimmers often have increased airway responsiveness and show variations dependent on training status.

P30.
THE EFFECT OF PHYSIOTHERAPEUTIC INTERVENTION AFTER ARTHROSCOPIC KNEE SURGERY

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Objectives: The aim for the study was to investigate if an intervention given by a physiotherapist, could change the outcome for patients who underwent arthroscopic knee surgery.
Method: A blinded randomised trial over 3 months. 20 men and 20 women admitted to knee surgery due to the suspicion for meniscal damage were included. Age between 18 to 54. Patients were randomised to either an instruction given by physiotherapist and a prescribed booklet or control group receiving standard hospital program consisting a prescribed booklet. Follow-up 14 days.
Main come measures: Range of motion, days before the patients returned to work, and swelling in the knee.
Results: The results indicate that the treatment group are making better progress compared to the control group in the period 3-14 days after the knee surgery. Every outcome-measures except walking shows better results and flexion of the knee is significantly better in the intervention group. The status after 14 days shows that the treatment group generally has a better outcome results than the control group most of them significantly better. We stratified for degenerative changes and sex and this did not change the significant results.
Conclusion: The conclusion indicates that knee arthroscopic patients gain of a minor physiotherapy instruction performed immediately after the arthroscopy.

P31.
REPAIR OF TYPE-2 SLAP-LESIONS USING CORKSCREW ANCHORS. A CLINICAL FOLLOW-UP STUDY

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1. Department of Orthopaedics, 2. Norra Älvsborg County Hospital and City Physiotherapy, Trollhättan Sweden and 3. North Sydney Orthopaedic and Sports Medicine Centre, Sydney Australia

Introduction: To make a clinical assessment of patients who had undergone arthroscopic repair of a type-2 SLAP lesion using Corkscrew® anchors.
Materials and methods: 15 consecutive patients who agreed to fill in a pre- and post-operative questionnaire were included in the study. The aetiology was traumatic in 11/15 patients and non-traumatic in 4/15. The time between the onset of the symptoms and the operation was 11 (3-120) months. At the index operation 4 patients underwent a concomitant acromioplasty, while 4 patients underwent supplementary anterior labrum fixation using suture anchors. 13/15 (87%) of the patients were physically re-examined by independent observers after a follow-up period of 25 (11-32) months. The questionnaires involved a patient administered assessment of 10 common activities of daily living.
Results: At follow-up the Rowe score was 84 (51-98) points and the Constant score was 83 (35-98) points. The Constant score on the non-operated side was 92 (66-100) points, ($p=0.005$). The external rotation in abduction was 85 (60-110)(on the operated side and 90 (80-110)(on the non-operated side ($p<0.05$). The isometric strength in abduction was 7.3 (0.8-14.4) kg on the operated side and 8.7 (2.7-15.5) kg on the non-operated side ($p=0.006$). Significant improvements ($p<0.05$) compared with the preoperative assessments were found in 2/10 activities of daily living and a tendency ($p<0.07$) towards improvement in another 4/10. Three patients underwent or were scheduled for further surgery during the follow-up period.
Discussion/Conclusions: Based on the limited number of patients included in the study it seems that the results were satisfactory and that the subjective patient administered evaluations improved after arthroscopic repair of type-2 SLAP lesions using Corkscrew® anchors.

P32.
THE IMPORTANCE OF KINETIC PROGRAMME IN REHABILITATION OF ELBOW INSTABILITY AFTER EPICONDILITIS

Ligia Rusu, University of Craiova, FEFS, Romania, Parcul Crizantemelor, E-37,Craiova, Dolj-1100, Romania

Introduction: The aim of this paper is to observe the evolution of athlets that presents lateral or medial epicondilitis with elbow instability. This kind of disorders is the results of tendinitis, luxations, fractures and surcharge of elbow in tenis. Alls patients presents pain, deficit of prehension, increase of muscle force and resistance of muscle,and few pain points .
Material and methods: We studied 20 tenismen, with age between 16-24years, that present instability of elbow, acute instability, instability in varus, instability in valgus, postero-lateral instability,and also alls had diagnosticated with epicondilitis. We evaluated the sportsmen using: clinical evaluation functional evaluation and also we used

some specials tests like: test of elbow tenismen,forced varus and valgus, pivot shiftand neurologic test like: Tinel signe, major pronator syndrome, Pinch-Grip signe.Before and after the kinetic programme we made also an muscle testing for flexors and extensors of elbow.
The kinetic programme that we used had three phases:
First phase: propose methods for decrease the pain and inflamator syndrome,using cryotherapy and repos.
Second phase: propose some methods for development the flexibility, force, resistance and mobility-using stretching-20-30secx5-10x2/day; extension,flxion prono-supination of elbow using weight 450gr.Extension of fingers using an elastic band 3times/day;some exercices using ball 3times/day. The surcharge of elbow had been mede using De Lorme Watkins tehniques.Also in this phase we used Cyriax masage, and cryotherapy 5min.
Third phase: propose the exercices for increase the resistance, and muscle flexibility and for maintain the resistance and flexibility.The methods are the same like in second phase.Also in this phase we begin some programme for return to sport activity.So we proposed the next protocol: 15-30min extension or flexion-depend what kind of epicondilitis is, lateral or medial-; then 2min flexion or extension in combination ; 45min alls movements of hand and elbow and then return to specific prepare like service and sport play.
Results: How we said we used some special and common tests and after programme we observed: presence of normal position of elbow at 67% patients; instability in valgus at 5%(before was 33%); intsbility in varus 9%(before 25%); elbow tenismen 50%(before 95%); normal flexion at 67%(before was 32%); normal extension at 100%(before was 33%); Also we observed a decrease of pain and inflamator syndrome and a good return to sport activity at 80% of tenismen.
Conclusion: A correct diagnostic of elbow instability, a good evaluation –clinical and functional evaluation, permit to build a good kinetic programme that must to include some **tiger point** for treatment because in kinetic therapy exist some principles that must be respect. Using protocol for return to sport activity is very important to be respect because we observed a good evolution and no rebound.So alls sportmen have a good evolution in sport performance. Using the stretching and a complex for muscle and flexibility permit to obtain very quikly the joint stability.

P33.
EYE INJURIES IN FLOORBALL- A CONSECUTIVE STUDY

Christer Swenson MD. Varberg Sjukhus, Sweden

In a consecutive study from 970901 to 991201, at the Sahlgren University hospital in Göteborg, 52 patients with eyeinjuries from floorball were found. 33/52 were injured when playing with friends in an unorganised gathering, not with a local club or the regional/national federation. 37/52 were non licensed players therefore not covered by the Swedish Floorball Federations national health insurance. 27/52 played by their own rules, not following the floorball rule book. 24/52 were forwards and 23/52 defenders. 10/52 were injured by the opponents floorballstick, 41/52 by the floorball. The most common diagnosis was bulbcontusion (94%, n=49), followed by hyphema (85%, n=44). 27 %,(n= 14), of the patients complained of eye-symtoms including visual disturbancies at follow-up. Follow-up time varied between one and 28 months.

P34.
ABUSE OF ANABOLIC ANDROGENIC STEROIDS, GROWTH HORMONES AND ERYTROPOIETIN REPORTED IN GENERAL PRACTICE

Dorte Bülow Keld, MD, Thomas Hahn, MD, PH.D, MPH.
University hospital Aarhus Amtssygehus, Aarhus, Denmark and Anti Doping Denmark, Copenhagen, Denmark

Introduction: Abuse of androgenic steroids (AAS), growth hormone (GH) and erythopoitin (EPO) is a public health problem of unknown proportions. The drugs are used on a long-term basis to gain physical enhancement in relation to sport, i. e. doping, or physical appearance and are connected with a wide variety of side-effects, which may be irreversible .
Material: A questionnaire was sent to 702 general practitioners (GP) in Denmark. The GPs were asked if they has seen side-effects to abuse of AAS, GH and EPO in their practise and to number the abusers seen in their practise within the last year.
Results: A total of 81% of the GPs responded the questionnaire. 33% of the doctors had seen or treated side-effects from abuse in their practise. 97 % of the reported side-effects was according to use of AAS. 22% of the doctors had within the last year seen patients, who admitted to or was highly suspected to take AAS, GH and/or EPO.
Discussion: This study shows that abuse of AAS has a considerably size in the general population, but GH and EPO doesnt seem to be used in a high extend in the general population.

P35.
TREATMENT OF COMPLICATIONS TO OIL INJECTIONS IN MUSCLES OF THE UPPER EXTREMITIES

Inger Marie Jensen Hansen(1), Finn Hjorth Madsen(1), Svend Erik Christiansen(2), Mette Brodersen(3), Niels Egund(4).
1. Department of Rheumatology, 2. Division of Sports Trauma, 3. Physiotherapist, Department of Physiotherapy, 4. Department of Radiology, Århus University Hospital

Introduction: Bodybuilders injecting vegetable oil into the muscles with cosmetic purposes had previously been described. We have treated the secondary complications to this habit in three persons.
M&M: Three male bodybuilders (28, 26 and 20 years) with symptoms after oil injection in the muscles of their upper arms using peanut-, rape- or an unidentified oil for cooking. In a different time distance from the injections, they presented with signs of inflammation. MR imaging demonstrated extensive skin and muscle inflammation with soft tissue necrosis of both upper arms in one patient, moderate in one and slight in one. Patients were treated with NSAID (3/3), Prednisone (2/3) and ultrasound (2/3). Evaluation of treatment was obtained by questioning of patient well-being's, clinical investigations, biochemical signs of inflammations and MR imaging.
Results: In spite of problems with patient compliance (patients continues partly using medications for muscle growing, patients did not show up as planned to blood-tests, MR imaging and consultations), during the treatment, all patients experienced disappearance of pain and the clinical signs of inflammation (redness, heat and oedema) disappeared. Biochemical parameter (SR, CRP and Fibrinogen) showed a decreasing tendency or normalized. Tissue abnormalities remained unchanged at MR imaging. Ultrasound without simultaneously NSAID or prednisone provoked recurrent inflammation in one patient.
Conclusions: Some complications to oil injections in musculature are treatable, although soft tissue damages persist during the time of investigation. Recurrence of inflammation can probably be provoked at any time.

P36.
SPORT- AND LEISURE ACTIVITIES AFTER TOTAL HIP ARTHROPLASTY

Lilli Sørensen, Shirzad Houshain, Per Wagner Kristensen, Sten Rasmussen. Department of Orthopaedic Surgery, Vejle Hospital, Denmark.

Introduction: The purpose of this study was to evaluate sports- and leisure activities after total hip arthroplasty (THA).
Material and methods: In a 3 year period from Sept. 1. 1997 to Aug. 31. 2000 - 257 patients underwent THA. A questionnaire was sent to 216 patients alive at followup. They were asked to list the type, degree and frequency of participation in sports- and leisure activities 5 years, six month before surgery and after surgery. Any problems they encountered upon returning to their activities were registred along with the SF36 Health Survey.
Results: 144 (66,7%) patients, 68 women, 76 men, median age 72,5 years, range (40-95) returned the questionnaire.
5 years before before surgery the patients were active on a daily or frequent basis taking a walk 64,5%, bicycling 36,1%, swimming 20,1%, dancing 11,8%, hunting/fishing 8,3% jogging 6,3% and badminton 6,3%. Six month before surgery 38,2 % were taking a walk, bicycling 24,4%, swimming 13,9%, dancing 6,2%, hunting/fishing 4,9%, jogging 1,4% and badminton 2,7%. At followup 39 month (21-57) after surgery 58,3% were taking a walk, bicyckling 28,5%, swimming 11,8%, dancing 14,6%, hunting/fishing 4,1%, jogging 1,4% and badminton 0,7%. 17 of the patients have had revision surgery,
Pain on VAS climbing stairs after surgery median 0,6 (0-10) and pain in activities median 0,6 (0-10) was noted. 12 patients (8,3%) use painkillers while active, 6,9% are member of a sportsclub and 11,6% have a job.
In SF36 PF out of ten scores Standardized Phycical Component was mean 40,96 (SD11,28) and Standerdized Mental Component 50,94 (SD14,10).
Conclusion: The patients after having THA are very active taking a walk, bicycling, swimming and dancing after surgery. They show a significant increase in daily or frequent walking after arthroplasty. A prospective investigation is necessary to determine which factors influence their return to sports.

P37.
EXERCISE *PER SE* DOES NOT INCREASE SERUM PSA

Olli J Heinonen, Tommi Vasankari, Pertti Koskinen, Kerttu Irjala.
Paavo Nurmi Centre, Dept of Physiology, University of Turku; Central Laboratory, Turku University Hospital; Sports Clinic Mehiläinen, Turku, FINLAND

Introduction: Prostate specific antigen (PSA) is an enzyme secreted by the prostatic gland. PSA determination is widely used for detection and follow-up of prostate cancer. Cycle ergometer exercise is reported to induce a 2-3.3 –fold increase in serum PSA (Clin Chem 1996). This may cause problems since cycle ergometer exercise is ideal exercise and rehabilitation model especially for the elderly.
Material and methods: Nine healthy males (aged 30, 34, 39, 43, 51, 60, 62, 63, 65 years)

and two males (59,62 years) with confirmed benign prostate hyperplasia were studied during an exercise test. All the males performed a cycle ergometer test with a standard load of 120W for 15 minutes. The cycle ergometer was always optimised to every individual according to the guidelines of American College of Sports Medicine. We used an anatomically designed saddle, the individual was properly positioned to the right position on the ergometer with 5° bend in the knee at maximal extension and the hands were in proper position on handlebar. The handlebar and the saddle were always set to the optimal height for every individual. Blood was drawn from antecubital vein before and immediately after the exercise test. Serum total and free PSA were analysed using dual-label time-resolved immunofluorometric assay (Auto-DELFIA®, ProStatus™, PerkinElmer Wallac, Turku).

Results: Cycle ergometer exercise did not change serum PSA concentration. The mean change from pre-exercise values in serum total and free PSA were +1% ± 6% (SD) and +3% ± 6% (SD) (NS), respectively.

Discussion/conclusion: Physical activity *per se* does not induce an increase in serum PSA concentration. We speculate that the previously reported high increase in serum PSA may be due e.g. to badly fitting saddle and improper adjustment use of the cycle ergometer. There is no need for the elderly to avoid cycle ergometer exercise when using the equipment prope.

Kommissorium for idrætsmedicinsk diplomuddannelse i Danmark

Udarbejdet af ad hoc udvalg nedsat af bestyrelsen: Klaus Bak, Kjeld B Andersen, Arne Gam, Henrik Aagaard, Bent Wulff Jakobsen. Godkendt på gneralforsamlingen i Odense 9. november 2001.

Baggrund

Gennem mange år har det fra Dansk Idrætsmedicinsk Selskab side været et ønske at etablere en formaliseret idrætsmedicinsk uddannelse. I forbindelse med Speciallægekommisionens forslag til fremtidig specialestruktur er det blevet klart, at det på nuværende tidspunkt ikke er realistisk at forestille sig at idrætsmedicin vil blive anerkendt som et selvstændigt speciale i Danmark. Bestyrelsen har derfor fundet det hensigtmæssigt at udarbejde planer for en diplomuddannelse. Det er meningen med diplomuddannelsen at etablere en egentlig basisuddannelse, og endvidere give mulighed for en frivillig registrering af efteruddannelse (CME). En sådan frivillig registrering vil kunne bruges ved ansættelser i idrætsmedicinsk relevante stillinger. Det er også håbet med dette tiltag at kunne motivere for efteruddannelse. Det er bestyrelsens holdning at registreringen skal forgå frivilligt og ikke som en foranstaltning til at gennemtvinge efteruddannelse. Systemet skal på sigt være simpelt opbygget, så der er tale om selvrapportering til en database. (Efterfølgende skal den enkelte kunne sammenligne sig med gennemsnittet.)

Organisering

DIMS' bestyrelse nedsætter diplomuddannelsesudvalg bestående af 3-5 medlemmer som primært rekrutteres fra bestyrelsen og uddannelsesudvalget. Udvalget bør bestå af mindst 1 rheumatolog, 1 alment praktiserende læge og 1 ortopædkirurg. Udvalget konstituerer sig med en formand, som skal være medlem af bestyrelsen.

Udvalget skal godkende alle ansøgere om Diplom-klassifikation ud fra indsendt dokumentation (kan eventuelt etableres via DIMS web-site).

Udvalget godkender alternative kurser og pointangiver disse samt andre DIMS kurser/symposier.

Krav til opnåelse af Diplom klassifikation:

1. Medlemskab af DIMS. Medlemskab af DIMS indebærer, at de etiske regler for selskabet efterleves.

2. B-autorisation fra Sundhedsstyrelsen.

3. Gennemført DIMS Trin 1 og Trin 2 kursus (indhentning af i alt 80 CME point, se nedenfor). Via alternative kurser kan tilsvarende kundskaber indhentes, idet kurset skal være godkendt, certificeret og pointvurderet af DIMS diplomuddannelsesudvalg.

Hvis alternative kurser ikke opnår samme pointvurdering som DIMS kurser, kan restpoint opnås via indhentning af suppleringspoint.

4. Overgangsordning. Det første halve år kan anden supplerende uddannelse pointangives af diplomuddannelsesudvalget og herved kan manglende deltagelse i Trin 1 og Trin 2 kursus undtagelsesvis erstattes.

5. I alt kræves 100 diplompoint – se skema.

6. Diplomklassifikation tildeles for en 5 årig periode, idet fortsat ret til at betegne sig Diplomlæge forudsætter vedligeholdelse af uddannelsen.

7. Der vil blive opkrævet et mindre gebyr ved udstedelse af diplom.

Krav til vedligeholdelse af Diplom klassifikation

1. Medlemskab af DIMS. Medlemskab af DIMS forudsætter at lægen følger de etiske regler for selskabet.

2. Indhentning af minimum 50 CME-point per 5 år.

3. Pointangivelse – se skema. Idrætsmedicinske arrangementer pointangives af diplomuddannelsesudvalget før kursusafholdelse.

CME pointsystem

Diplom uddannelse:

Aktivitet	Certificeringspoint
TRIN 1	40 point
TRIN 2	40 point
Deltagelse i Årsmøde (seneste 5 år)	10 point (max 10 point)
Mindst 2 års samlet praktisk erfaring som klublæge, TeamDK læge eller tilknytning til idrætsklinik (min. 1 time per uge)	10 point

Diplomuddannelse suppleringspoint:

Aktivitet	Certificeringspoint
Puplicerede videnskabelige artikler indenfor idrætsmedicin	5 point per artikel (max 10 point)
Arrangør af eller undervisning på idrætsmedicinske kurser eller kongresser	5 point (max 10 point)
Deltagelse i internationale idrætsmedicinske/-kirurgiske kongresser	10 point (max 10 point)
Deltagelse i godkendte idrætsmedicinske kurser eller symposier	10 point per kursus (max 20 point)
Anden idrætsmedicinsk relevant aktivitet	5 point

Pointangivelse – vedligeholdelse

Aktivitet	Certificeringspoint
Deltagelse i årsmøde	10 point
Puplicerede videnskabelige artikler indenfor idrætsmedicin	5 point per artikel
Arrangør af eller undervisning på idrætsmedicinske kurser eller kongresser	10 point
Deltagelse i internationale idrætsmedicinske/-kirurgiske kongresser	10 point
Deltagelse i godkendte idrætsmedicinske kurser eller symposier	5-10 point per kursus
Anden idrætsmedicinsk relevant aktivitet	5 point

ANNONCE

Læger til diplomanerkendelse i idrætsmedicin søges ...

Fristen for ansøgning om diplomanerkendelse i idrætsmedicin er forlænget til den 31. december 2002.
Skynd dig – kom før din nabo!

Udfyld felterne i nedenstående skema – eller en fotokopi – og send det med relevant dokumentation til:

DIMS v/Louice Krandorf, Feldborgvej 6, 2770 Kastrup, **INDEN 31. DECEMBER 2002**

På diplomuddannelsesudvalgets vegne, Klaus Bak

Ansøgning om Diplom anerkendelse i idrætsmedicin

Se krav til opnåelse af Diplom klassifikation på modstående side. Husk at vedlægge kursusbeviser eller anden dokumentation, hvis denne haves.

BASISPOINT	
Aktivitet og diplompoint	**Kursussted og årstal**
DIMS TRIN 1 (40 point)	
DIMS TRIN 2 (40 point)	
Deltagelse i årsmøde (seneste 5 år) (10 point)(max. 10 point)	
Mindst 2 års samlet praktisk erfaring som klublæge, Team Danmark læge eller tilknytning til idrætsklinik (min. 1 time per uge) (10 point)	Klub/forbund/klinik: Periode:
SUPPLERINGSPOINT	
Aktivitet og diplompoint	
Publicerede videnskabelige artikler inden for idrætsmedicin (5 point per artikel)(max. 10 point)	VEDLÆG venligst liste over de publikationer som ønskes bedømt
Arrangør af eller undervisning på idrætsmedicinske kurser og kongresser (5 point) (max. 10 point)	Angiv sted og årstal:
Deltagelse i internationale idrætsmedicinske eller internationale kongresser med dokumenteret idrætsmedicinsk indhold (10 point)(max. 10 point)	Angiv sted og årstal:
Deltagelse i godkendte idrætsmedicinske kurser eller symposier (10 point per kursus)(max. 20 point)	Angiv sted og årstal:
Anden idrætsmedicinsk relevant aktivitet (5 point)	Angiv aktivitet:
NAVN:	Kandidat fra år:

Pligttekst til bagsideannoncen:

6th
Scandinavian
Congress on
Medicine and
Science in
Sports
2002

www.sportscongress.dk

Kongresser • Kurser • Møder

INTERNATIONALE

21. - 24. november 2002, Danmark
6th Scandinavian Congress on Medicine and Science in Sports, Århus
Info: www.sportscongress.dk

27. - 30. november 2002, Østrig
European Congress on Prevention of Diseases through Physiotherapy, Wien.
Info: www.physio.at/congress/2002.htm

10. - 14. marts 2003, New Zealand
2003 ISAKOS Congress, Auckland.

7. - 12. juni 2003, Spanien
14th International Congress of the World Confederation for Physical Therapy (WCPT), Barcelona.
Info: www.wcpt.org • www.aefi.net

20. - 23. juli 2003, USA
29th Annual Meeting of the American Orthopaedic Society of Sports Medicine (AOSSM), San Diego, CA.
Info: www.sportsmed.org

Hjælp os med at gøre denne liste bedre!
Giv Dansk Sportsmedicin et tip om interessante internationale møder og kongresser – helst allerede ved første annoncering, så læsernes evt. deltagelse kan planlægges i god tid.

DIMS kursuskalender

De enkelte kurser og arrangementer annonceres særskilt - her og på DIMS hjemmeside, hvorefter tilmeldinger modtages.

DIMS TRIN I, øst. Kursus.
10. - 14. marts 2003, Jægersborg.
Målgruppe: Læger.
Arrangør: DIMS

SKISPORT og SKADER. Kursus.
14. - 23. marts 2003, Sölden, Østrig.
Målgruppe: Læger.
Arrangør: DIMS
(overtegnet, optager aktuelt kursister på venteliste)

DIMS TRIN I, vest. Kursus.
Uge 38, september 2003, Ålborg.
Målgruppe: Læger.
Arrangør: DIMS

DIMS TRIN 2. Kursus.
6. - 9. november 2003, Århus.
Målgruppe: Læger.
Arrangør: DIMS

KETCHERSPORT. Symposium.
Januar/februar 2004, København.
Koordineres med badmintonturneringen "Danish Open" eller tennisturneringen "Copenhagen Open".
Målgruppe: Læger, fysioterapeuter.
Arrangør: DIMS, FFI

VINTERSPORT. Symposium.
Uge 10 2004, formodentlig Sölden i Østrig.
Målgruppe: Læger, fysioterapeuter.
Arrangør: DIMS, FFI, DSMM.

Venlig hilsen
DIMS Uddannelses Udvalg

FFI kursuskalender

Tilmeldingsfrister:
Hold øje med detailannoncering i Dansk Sportsmedicin og Fysioterapeuten.

Introduktionskurser
• 28. februar og 1. marts 2003 på Fysioterapeutskolen i Odense.
• 7. og 8. marts 2003 på Fysioterapeutskolen i København.

Regionskurser
"Fod- og truncuskursus"
• 4. og 5. april 2003
"Hofte- og truncuskursus"
• 25. og 26. april 2003
"Albue/hånd- og truncuskursus"
• 12. og 13. september 2003

"La Santa kursus 2003"
Indhold: "Introduktion + Hofte/knæ/fod og truncus"
Tid: 26. september til 3.oktober 2003 på La Santa Sport, Lanzarote.

Kursus i "Dynamic Stability and Muscle Balance" (nakke, skulder) på La Santa.
Tid: Uge 35 eller 36 2003 på La Santa Sport, Lanzarote.

VINTERSPORT. Symposium, marts 2003, 2004
KETCHERSPORT. Symposium, jan/feb. 2004

DIMS kurser

Info: Idrætsmedicinsk Uddannelsesudvalg, c/o sekr. Lissi Petersen, Helligkorsvej 33, 2.tv., 4000 Roskilde.

Generelt om DIMS kurser

DIMS afholder faste årlige trin 1 og trin 2 kurser for læger som ønsker at opnå kompetence som idrætslæge.

DIMS trin 1 kursus: er et basal-kursus, der henvender sig til færdiguddannede læger, som ønsker at beskæftige sig med den lægelige rådgivning og behandling af idrætsudøvere.

Alle regioner vil blive gennemgået med gennemgang af de almindeligste akutte skader og overbelastningsskader.

Kurset afholdes i samarbejde med Forsvarets Sanitetsskole, og en væsentlig del af kurset beskæftiger sig med den praktiske kliniske udredning og behandlingsstrategi af nytilskadekomne militær-rekrutter. Man får således lejlighed til at undersøge 30-40 patienter under supervision og vejledning af landets eksperter indenfor de enkelte emner.

Kurset varer 40 timer over 4-5 hverdage.

Hvert år afholdes et eksternatkursus (med mulighed for overnatning) øst for Storebælt på Forsvarets Sanitetsskole i Jægersborg i uge 11, mandag - fredag, og et internatkursus vest for Storebælt, i reglen uge 40 på Fredericia Kaserne.

DIMS trin 2 kursus: er et videregående kursus, der henvender sig til læger med en vis klinisk erfaring (mindst ret til selvstændig virke) samt gennemført DIMS trin 1 kursus eller fået dispensation herfor ved skriftlig begrundet ansøgning til DIMS uddannelsesudvalg.

Kurset afholdes på en moderne dansk idrætsklinik, hvor man gennem patientdemonstrationer får et indblik i moderne undersøgelses- og behandlingsstrategier.

På dette kursus forklares principperne i den moderne idrætstræning og der bliver lagt mere vægt på de biomekaniske årsager til idrætsskader og en uddannelse af kursisterne i praktisk klinisk vurdering heraf. Derudover diskuteres træningens konsekvens og muligheder for udvalgte medicinske problemstillinger (overlevelse, fedme, endokrinologi, hjerte/kar sygdomme, lungesygdomme, osteoporose, arthritis, arthrose).

Kurset varer 40 timer over 4 dage (torsdag-søndag).

Hvert år afholdes et eksternat kursus i oktober måned (overnatning sørger kursisterne selv for). I lige år afholdes kurset øst for Storebælt (Bispebjerg Hospital), i ulige år vest for Storebælt (Århus Amtssygehus).

IDRÆTSMEDICIN TRIN 1, øst

Formål og indhold: Basalt kursus i idrætsmedicin med hovedvægt lagt på diagnostik af hyppigste idrætsskader, herunder grundig gennemgang af akutte og overbelastningsskader i knæ, skulder og ankel/underben. Patientdemonstrationer med instruktion og indøvelse af klinisk undersøgelsesteknik. Planlægning og tilrettelæggelse af udredning, behandling og genoptræning af skadede idrætsudøvere. Doping, idrætsfysiologi og biomekanik med henblik på at øge forståelsen for profylaktiske tiltag, både specifik idrætsskadeprofylakse og almen sygdomsprofylakse i forbindelse med idræt. Kurset udgør første del af planlagt postgraduat diplomuddannelse i idrætsmedicin; 40 CME point i DIMS regi.

Målgruppe: Fortrinsvis praktiserende og yngre læger, der har interesse for idrætsmedicin og som ønsker basal indføring i emnet.

Form: Eksternat. Indkvartering kan måske tilbydes. Forelæsninger afvekslende med emneorienterede, praktiske kliniske øvelser og patientdemonstrationer.

Kursusledelse: Henrik Aagaard og Finn Løye. Arrangør: Dansk Idrætsmedicinsk Selskab (DIMS) i samarbejde med Forsvarets Sanitetsskole.

Undervisere: Marianne Backer, Mogens Dam, Flemming Enoch, Andreas Hartkopp, Finn Johannsen, Michael Kjær, Lars Konradsen, Britt Petersen, Henrik Sørensen, Gitte Vestergaard, Henrik Aagaard.

Tid og sted: Mandag 10. marts til fredag d. 14. marts 2003, kl. 08.00 - 16.00. Forsvarets Sanitetsskole, Jægersborg Kaserne, Jægersborg Allé 150, 2820 Gentofte. Telefon 3977 1200.

Kursusafgift: Yngre læger, medlemmer af DIMS: 3.500 kr., andre yngre læger: 4.500 kr. Ikke yngre læger, medlemmer af DIMS: 4.000 kr., andre ikke yngre læger: 5.000 kr. Kursusafgiften inkluderer frokost og kaffe.

Tilmelding: Brev, e-post eller fax med navn, adresse samt påførelse af lægelig søjle og eventuelt medlemsskab af DIMS til kursussekretær Lissi Petersen, Helligkorsvej 33 B, 2.tv., 4000 Roskilde. E-post: lissi-dan@get2net.dk, tlf. 4635 4893. Giro: (reg. 1199) konto 16023337. Kost og logi mod betaling kan arrangeres på Jægersborg Kaserne i det omfang, der er ledige værelser efter nærmere aftale med Kaserneforvaltningen, telefon 3977 141611.
Maks. 30 deltagere. Sidste frist for tilmelding: 1. februar 2003.

FFI årsmødedag 2003

FFI Årsmøde 2003

FFI holder årsmøde/generalforsamling på Hotel Nyborg Strand lørdag, den 22. februar 2003.

Program:

Fagligt tema: Grundtræning/profylaktisk træning med enkle redskaber

Kl: 11.00 - 11.45 Teori ved fysioterapeut Lotte Paarup
Kl: 11.45 - 13.15 Generalforsamling
Kl: 13.15 - 14.15 Frokost
Kl: 14.15 - 15.30 Praktik ved fysioterapeut Lotte Paarup

Om underviseren:
Lotte Paarup er fysioterapeut, aktiv håndboldspiller og idrætsfysioterapeut, instruktør og konsulent samt medstifter af Thera-Band Academy og konceptudvikler og har desuden udgivet to rygtræningsvideoer.
Lotte Paarup er især kendt for sine kurser og foredrag i Danmark og i udlandet. Lotte Paarup arbejder hovedsageligt med træning og genoptræning, med speciale i rygtræning og sundhed.

Om undervisningsindholdet:
Hvilken rolle har fysioterapeuten i den forebyggende træning samt grundtræningen af den enkelte idrætsudøver - hvad ved vi og hvordan kan vi bruge det ?
Vores fornemste job er uden tvivl genoptræningen/behandlingen af en skadet idrætsudøver - hvordan kan vi forbedre og effektivisere vores genoptrænings-/behandlingsmetoder ud fra tanken om funktionel træning. Meget ofte gør de små ændringer den store forskel for resultatet - sagt på en anden måde; at vi skal holde fast i alle de gode ting vi allerede gør, men tilføre ny viden og erfaringer for at blive endnu bedre...
I praksis kræver det at tænke i retning af balance og koordination med fokus på stabilitet omkring truncus. Mange idrætsudøvere er sandsynligvis ikke godt nok trænet, i forhold til de krav som den individuelle sportsgren stiller til kroppen. En vigtig del af fysioterapeutens job må uden tvivl være, at gravе en lille smule dybere end bare at behandle det akutte problem - Hvorfor opstår en skade ?
For at vi som terapeuter kan forstå og formidle træning, er det et krav at have egen kropslige erfaringer med de træningsmetoder som vi benytter - derfor sættes fokus på to meget enkle redskaber i den funktionelle rehabilitering; nemlig Store Træningsbolde (Exercise Balls) og elastikker (Thera-Band).

Pris: Deltagelse er gratis men det er nødvendigt, at du tilmelder dig med hensyn til frokosten.
Tilmelding: Til Marianne Dall-Jepsen, Mikkelborg Allé 84, 2970 Hørsholm, tlf: 45 86 44 85,
e-mail: m.dall-jepsen@mail.dk
Tilmeldingsfrist: Senest den 15. februar 2003. Deltagelse i generalforsamlingen alene kræver IKKE tilmelding.

FFI generalforsamling 2003

I henhold til vedtægterne indkaldes hermed til

ORDINÆR GENERALFORSAMLING
fredag, den 22. februar 2003
kl. 11.45

på Hotel Nyborg Strand, 5800 Nyborg

Dagsorden:

1. Valg af dirigent
2. Beretning fra bestyrelsen
3. Fremlæggelse af det reviderede regnskab for 2002
4. Fastsættelse af kontingent for 2004
5. Indkomne forslag
6. Valg af bestyrelse
Medlemmerne William Sloth og Gorm H. Rasmussen afgår efter tur
Suppleanterne Marianne Dall-Jepsen og Henning langberg afgår efter tur
7. Valg af 2 revisorer
Marianne Jensen afgår efter tur
Niels Bo Andersen afgår efter tur
8. Eventuelt

Forslag, der ønskes behandlet under punkt 5, **samt kandidatforslag til valg under punkt 6 og 7**, skal være bestyrelsen i hænde senest den 9. februar 2003, og indsendes til:

Fagforum for Idrætsfysioterapi
Gorm H. Rasmussen
Terp Skovvej 82
8270 Højbjerg

FFI kurser 2003

Info: Kursusudv., Vibeke Bechtold, Kærlandsvænget 10, 5260 Odense S. Tlf. 6591 6693/2028 4093 Mail:vibeke.bechtold@odenergfys.dk

"Idrætskursus - Introduktion til idrætsskader og de øvrige idrætskurser relateret til idrætsskader i forskellige dele af kroppen."
(Dette kursus er et krav som forudsætning for at kunne deltage på de øvrige kurser)

Målgruppe: Fysioterapeuter der arbejder med idræt på forskellig vis.

Mål og indhold for Introduktionskursus:
At kursisterne:
• får forståelse for epidemiologiske og etiologiske forhold ved idrætsskader
• får forståelse for og indsigt i forskning anvendt i idrætsmedicin
• får forståelse for etiske problemstillinger relateret til idræt
• kan anvende klinisk ræsonering i forbindelse med idrætsskader
• kan anvende biomekaniske analysemetoder
• får forståelse for vævsegenskaber og vævsreaktioner
• kan anvende primær skadesundersøgelse og skadesbehandling
• får forståelse for overordnede behandlingsstrategier til idrætsaktive
Indhold:
• klinisk ræsonnering
• epidemiologi
• forskning og evidens
• etik
• biomekanik
• vævsegenskaber og vævsreaktioner
• behandlingsstrategier
• læring og formidling
• primær skadesundersøgelse og skadesbehandling

Tid og Sted:

(ret til ændringer forbeholdes)

• 28. februar - 1. marts 2003 på Fysioterapeutskolen i Odense.
• 7. - 8. marts 2003 på Fysioterapeutskolen i København.
Pris: Ca. 2300 kr. for medlemmer og 2600 kr. for ikke medlemmer. Prisen dækker kursusafgift og fortæring under kursus.
Deltagere: Ca. 25 fysioterapeuter. Medlemmer af fagforum har fortrinsret.
Tilmelding: Tilmeldingsfrist ca. en måned før kursusafholdelse. Se detailannoncering senere her i bladet, i DF's kursuskatalog, i "Fysioterapeuten" eller på www.sportsfysioterapi.dk
Undervisere: Fysioterapeuter fra Fagforum for idrætsfysioterapi samt idrætsmedicinske ressourcepersoner.

"Idrætskurser relateret til idrætsskader i forskellige dele af kroppen" (truncus og skulder/albue-hånd/hofte/knæ/fod)

Målgruppe: Fysioterapeuter der arbejder med idræt på forskellig vis.

Mål og indhold for alle kurserne relateret til regioner:
At kursisterne:
• får forståelse for epidemiologiske og etiologiske forhold i de enkelte kropsområder
• kan analysere bevægelsesmønstre og belastningsforhold ved idræt
• kan anvende målrettede undersøgelses-, forebyggelses- og behandlingsstrategier
• får kendskab til parakliniske undersøgelses- og behandlingsmuligheder indenfor idrætsmedicin
• kan vurdere skadernes omfang og alvorlighed samt planlægge og vejlede i forhold til dette.
Indhold:
• funktionel anatomi og biomekaniske forhold
• epidemiologi og etiologi
• traumatologi
• målrettede undersøgelser og tests både funktionelle og specifikke
• målrettede behandlings- og rehabiliteringsstrategier
• forebyggelsesstrategier
• klartest
• parakliniske undersøgelser og behandlingsstrategier

Emne, Tid og Sted:

(ret til ændringer forbeholdes)

"Fod- og truncuskursus"
• 4. og 5. april 2003 på Fysioterapeutskolen i København.
"Hofte- og truncuskursus"
• 25. - 26. april 2003 på Fysioterapeutskolen i Odense.
"Albue- / hånd- og truncuskursus"
• 12. -13. september 2003 på Fysioterapeutskolen i København.

Pris: Ca. 2300 kr. for medlemmer og 2600 kr. for ikke medlemmer. Prisen dækker kursusafgift og fortæring under kursus.
Deltagere: 22 fysioterapeuter. Medlemmer af fagforum har fortrinsret.
Tilmelding: Tilmeldingsfrist ca. en måned før kursusafholdelse. Se detailannoncering senere her i bladet, i DF's kursuskatalog, i "Fysioterapeuten" eller på www.sportsfysioterapi.dk
Undervisere: Fysioterapeuter fra Fagforum for idrætsfysioterapi.

"Idrætskursus 2003 på La Santa Sport"

Indhold: "Introduktion + Hofte/knæ/fod og truncus"
Målgruppe, mål og indhold - se beskrivelserne under introduktionskursus og kurserne for U.E..
Tid: Uge 40. Fra fredag den 26. september til fredag den 3. oktober 2003. Der vil være afgang og hjem-

Andre kurser og møder

komst fra København eller Billund.
Sted: Club La Santa, E - 35560 Tinajo, Lanzarote, tlf. 0034-928599999.
Tilmelding: Tilmeldingsfrist ca. 7 måneder før kursusafholdelse med betaling af depositum på 1.000 kr.. Øvrig betaling ca. 3 måneder før kursusafholdelse. Se detailannoncering senere her i bladet, i DF's kursuskatalog, i "Fysioterapeuten" eller på www.sportsfysioterapi.dk
Deltagere: 40 fysioterapeuter. Medlemmer af faggruppen har fortrinsret.

Kursus i DYNAMIC STABILITY & MUSCLE BALANCE på La Santa
Emne: NAKKE OG SKULDER

Fagforum for Idrætsfysioterapi og faggruppen for Manuel Terapi arrangerer i samarbejde med "Kinetic Control" kursus i ovenstående emne

Indhold: Undersøgelse og rehabilitering af bevægelsesdysfunktion ved hjælp af dynamisk stabilitet og korrektion af muskulær ubalance.

Praktiske oplysninger:

Tid: Uge 35 eller 36, 2003. Endeligt tidspunkt oplyses senere.
Kursusform : Eksternat
Sted: Club La Santa, E - 35560 Tinajo, Lanzarote, tlf. 0034-928599999.
Undervisere: Fysioterapeuter fra "Kinetic Control".
Pris: 8900,- kr. for medlemmer og 9300,- kr. for ikke- medlemmer. Prisen dækker kursusafgift flyrejse og ophold i 3 personers lejlighed uden fortæring. Det vil være muligt at bo i 1-, 2- eller 4-personers lejlighed mod ekstrabetaling.
Deltagere: 26 fysioterapeuter. Medlemmer af FFI og MT har fortrinsret og medlemmer, der har haft minimum 1 kursus i en af disses regier vil blive prioriteret højest..
Tilmelding: Tilmeldingsfrist ca. 7 måneder før kursusafholdelse med betaling af depositum på 1.000 kr.. Øvrig betaling ca. 3 måneder før kursusafholdelse. Se detailannoncering senere her i bladet, i DF's kursuskatalog, i "Fysioterapeuten" eller på www.sportsfysioterapi.dk
Kursusleder og information: Vibeke Bechtold, tlf: 65 91 66 93, mail: vibeke.bechtold@odenergfys.dk

FFI-kurser "på bedding":

Symposium om vintersport
Marts 2004 i Østrig.
Målgruppe: Læger, fysioterapeuter.
Arrangør: DIMS, DSMM, FFI og MT

Symposium om ketchersport
Januar/februar 2004 i København.
Målgruppe: Læger, fysioterapeuter.
Arrangør: DIMS og FFI

1st FIMM Scientific Committee Conference

The Conference will be held at:

Radisson SAS H. C. Andersen Hotel, Odense, Denmark, Thursday 30th of January 2003, 2.00 – 6.00 pm

The FIMM Scientific Committee is happy to announce the 1st Scientific Committee Conference to be held in conjunction with the annual joint meeting of DSMM and DFFMT.

The meeting will be open for health personnel with an interest in Musculoskeletal Medicine.

The topic of the meeting is:

Reliability and efficacy studies in low-back pain and other musculoskeletal disorders

We welcome contributions to the meeting and ask you forward **abstracts** to the organising committee before the 16th of December 2002.

There will be free admission for members of the Danish organisations including members of the Danish McKenzie Institute and of course for those contributing to the meeting.

Looking forward to seeing you, FIMM Scientific Committee.

Organising committee:

Jacob Patijn, PhD
jpat@sane.azm.nl

Lars Remvig, DrMedSci
remvig@rh.dk

Dansk SPORTSMEDICIN

Adresse:

Redaktionssekretær
Gorm Helleberg Rasmussen
Terp Skovvej 82
8270 Højbjerg
8614 4287 (A), 8614 4288 (P)
ffi-dk@post3.tele.dk (e-post)

Redaktionsmedlemmer for DIMS:

Overlæge Allan Buhl
Spicavej 14
8270 Højbjerg 8667 1196 (P)
abuhl@telefona.dk

Overlæge Per Hölmich
Kjeldgårdsvej 13 - Hareskovby
3500 Værløse 4498 0014 (P)
per.holmich@ah.hosp.dk

Speciallæge Arne Nyholm Gam
Frederikssundsvej 152 B, 1.tv.
2700 Brønshøj 3860 3300 (A)
myosul@email.uni2.dk

Overlæge Svend Erik Christiansen
Emborgvej 42 A
8660 Skanderborg 8788 5272 (P)
SvenderikC@netscape.net

Redaktionsmedlemmer for FFI:

Fysioterapilærer Leif Zebitz
Dankvart Dreyersvej 56
5230 Odense M 6612 3220 (P)
Leif.Zebitz@odenergfys.dk

Fysioterapeut Henning Langberg
Idrætsmedicinsk Forskningsenhed, BBH
2400 København NV 3531 6089 (A)
hl02@bbh.hosp.dk

Fysioterapeut Svend B. Carstensen
Lindegårdsvej 8 A
8320 Mårslet 8629 2057 (P)
lindegaardsvej.8a@post.tele.dk

DANSK IDRÆTSMEDICINSK SELSKAB

Adresse:

DIMS
c/o sekretær Louice Krandorf
Feldborgvej 6
2770 Kastrup
Tlf: tirsdage 3252 7442
E-mail: louice@ah.hosp.dk
Web: www.sportsmedicin.dk

Formand Klaus Bak
Rosenstandsvej 13
2920 Charlottenlund, tlf. 3964 0302 (P)
kbak@post4.tele.dk

Næstformand Arne Nyholm Gam
Lyngholmvej 53
2720 Vanløse
myosul@email.uni2.dk

Kasserer Bent Wulff Jakobsen
Stenrosevej 49
8330 Beder
b-wulff@dadlnet.dk

Kjeld B. Andersen
Tranevej 13
7451 Sunds
kbandersen@dadlnet.dk

Inge Lunding Kjær
Nørregade 19, 3.th.
9000 Ålborg
ilk@dadlnet.dk

Andreas Hartkopp
Bodegårdsvej 9
3050 Humlebæk
hartkopp@dadlnet.dk

Fysioterapeut Bente Andersen
Kabbelejevej 22, 1.tv.
2700 Brønshøj
bente.andersen@kbhfys.dk

Suppleant Lars Konradsen
Birkehaven 26
3400 Hillerød
lkonrad@dadlnet.dk

Suppleant, fysioterapeut
Gorm Helleberg Rasmussen
Terp Skovvej 82
8270 Højbjerg
ffi-dk@post3.tele.dk

fagforum for idrætsfysioterapi

Adresse:

Fagforum for Idrætsfysioterapi
Terp Skovvej 82
8270 Højbjerg
8614 4287 (tlf.+tlf.svarer)
ffi-dk@post3.tele.dk (e-mail)
www.sportsfysioterapi.dk

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Terp Skovvej 82
8270 Højbjerg 8614 4288 (P)
ffi-dk@post3.tele.dk

Sekretær Birgith Andersen
Sædding Strandvej 59
6710 Esbjerg V 7611 9088 (P)
birgith@esenet.dk

Marianne Dall-Jepsen
Mikkelborg Allé 84
2970 Hørsholm 4586 4485 (P)
m.dall-jepsen@mail.dk

Vibeke Bechtold
Kærlandsvænget 10
5260 Odense S 6591 6693 (P)
vibeke.bechtold@odenergfys.dk

William Sloth
Hovvejen 3 - Mammen
8850 Bjerringbro 8668 5400 (P)

Suppleant Henning Langberg Jørgensen
Willemoesgade 61, 3.tv.
2100 København Ø 3526 2595 (P)
hl02@bbh.hosp.dk

Suppleant Niels Erichsen
Brådervej 14
3500 Værløse 44483231 (P)
nefys@hotmail.com

fagforum for idrætsfysioterapi

Kontaktpersoner 2002

Hovedstadskredsen og Københavns Amtskreds:
Christian Couppé, Julius Thomsens Plads 4, 4.th., 1925 FREDERIKSBERG C, 35366146(P)
Frank Jacobsen, Vejringevej 30, 2730 HERLEV, 44921090(P)

Frederiksborg Amtskreds:
Lotte Bølling, Håndværkerhaven 22, 2200 KØBENHAVN N, 31678467(P)
Klaus Petersen, Duevej 20, 2970 HØRSHOLM, 39632310(A), info@ordrupfysio.dk(mail)

Roskilde Amtskreds:
Dorte Thorsen, Kildehusvej 27, 4000 ROSKILDE, 46322323(A)
Vibeke Pedersen, Munkedammen 4, 4320 LEJRE, 46480208(P)

Vestsjællands Amtskreds:
Hanne Merrild, Sct. Knudsgade 13 B, st., 4200 SLAGELSE, 53534118(P), 58559790(A)
Gurli Knudsen, Garvergårdsvej 80, 4200 SLAGELSE, 53527138(P), 53523941(A)

Storstrøms Amtskreds:
Philippa Nielsen, Fjordvej 9, 2.th., 4800 NYKØBING F, 54826002(P), 54885534(A)
Bonnie Skovgaard, Blansmosevej 12, 4952 STOKKEMARKE, 54712050(P), 54885534(A)

Bornholms Amtskreds:
Ledig

Fyns Amtskreds:
Jørgen Holme, Bergmannsvej 118, 5700 SVENDBORG, 62207670(P), 62211080(A),
Frederik Lassen, Møllergade 108, 5700 SVENDBORG , 62203630(P)
fredlassen@yahoo.dk(mail)

Nordjyllands Amtskreds:
Anders Nielsen, Hans Aabelsvej 11, 9300 SÆBY, 96890096(P), 98842800(A)
Steven Franch, Stormgade 8, 1.th., 9000 ÅLBORG, 98115905(P), 96225860(A)

Viborg Amtskreds:
Peter Lasse Pedersen, Præstemarken 11 - Vristed, 7800 SKIVE, 97522489(P), 97524500(A)
Morten Sode, Sct. Nikolajgade 23, 1.tv., 8800 VIBORG, 86614006(P), 86622254(A), sode.hede@get2net.dk(mail)

Århus Amtskreds:
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Svend B. Carstensen, Lindegårdsvej 8A, 8320 Mårslet, 86292057 (P), lindegaardsvej.8a@post.tele.dk (mail)

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Tine Hasselbrinck Madsen, Skoletoften 3 - Sinding, 7400 HERNING, 97136171(P), 97885200(A), tine@netfyssen.dk(mail)

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Anders Winther Christensen, Svendsgade 66, st.tv., 6700 ESBJERG, 40934508(P), awinther@ofir.dk(mail)
Susie Ø. Jensen, Sletten 45, 6800 VARDE, 75212149(P), susieoe@hotmail.com(mail)

Sønderjyllands Amtskreds:
Helle Algren Brøgger, Kortegade 1, st.tv., 6100 HADERSLEV, 73520302/40199898(P), helle.broegger@mail.tele.dk(mail)

IDRÆTSKLINIKKER

Bortset fra klinikkerne på KAS Glostrup, KAS Gentofte og KAS Herlev i Københavns amt og lægeværelset i Ribe amt, kræver alle henvendelser henvisning fra læge.

Frederiksberg og Københavns kommune
Bispebjerg Hospital
Tlf. 35 31 35 31
Overlæge Michael Kjær
Mandag til fredag 8.30 - 14

Københavns amt
KAS Glostrup
Tlf. 43 43 08 72
Overlæge Claus Hellesen
Tirsdag 16 - 18.30, torsdag 16 - 18

KAS Gentofte
Tlf. 39 68 15 41
Overlæge Uffe Jørgensen
Tirsdag 15.30 - 18.30

KAS Herlev
Tlf. 44 88 44 88
Overlæge Bent Ebskov
Torsdag 18 - 19.30

Amager Hospital, Skt. Elisabeth
Tlf. 32 34 32 93
Overlæge Per Hölmich
Tirsdag 15 - 17

Frederiksborg amt
Frederikssund Sygehus
Tlf. 48 29 55 80
Overlægerne Tom Nicolaisen, Henrik Chrintz og Peter Albrecht-Olsen
Mandag til fredag 8 - 16

Storstrøms amt
Næstved Centralsygehus
Tlf. 53 72 14 01
Overlæge Jes Hedebo
Tirsdag 16 - 18

Nykøbing Falster Centralsygehus
Tlf. 54 85 30 33
Overlæge Troels Hededam
Torsdag 15.30 - 17.30

Fyns amt
Odense Universitetshospital
Tlf. 66 11 33 33
Overlæge Søren Skydt Kristensen
Onsdag 10.45 - 13.30, fredag 8.30 - 14

Ribe amt
Esbjerg Stadionhal (lægeværelse)
Tlf. 75 45 94 99
Læge Nils Løvgren Frandsen
Mandag 18.30 - 20

Ringkøbing amt
Herning Sygehus, ortopædkir. amb.
Tlf. 99 27 27 27
Overlæge Steen Taudal
Torsdag 12 - 15

Århus amt
Århus Amtssygehus
Tlf. 89 49 75 75
Overlæge Bent Wulff Jakobsen
Tirsdag 15 - 18, torsdag 14 - 17

Viborg amt
Viborg Sygehus
Tlf. 89 27 27 27
Overlæge Allan Buhl
Tirsdag og torsdag 13 - 16.30

Nordjyllands amt
Ålborg Sygehus Syd
Tlf. 99 32 11 11
Overlæge Gert Kristensen
Mandag til fredag 8.50 - 14

Bornholms amt
Bornholms Centralsygehus
Tlf. 56 95 11 65
Overlæge John Kofod
Tirsdag (hver anden uge) 16.30 - 18

Postbesørget blad
nr. 12133 (8245 ARC)

Adresseændringer:
Medlemmer af DIMS og FFI skal meddele ændringer til den repektive forenings medlems-kartotek.
Abonnenter skal meddele ændringer til Dansk Sportsmedicins adresse.