Hamstring electromyographic activation according to 30 rehabilitation knee exercises

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Keywords: Hamstring; Rehabilitation; Electromyography; Knee

Objective.– To quantify the hamstring activation according to various rehabilitation exercises used to control the knee.

Method.– Fifteen healthy subjects, 22.8 ± 3 years old, were evaluated on the thigh to quantify the electrical activity of hamstring muscles and the quadriceps when performing 30 rehabilitation exercises. Various functional exercises of walking, standing, sitting position, and analytic hamstring exercises according to isometric and eccentric contractions were studied.

Results.– After signal processing, results were expressed according to the area under the curve (µvolts/s) of the RMS (Root-Mean-Square) to organize an exercise hierarchy according to the intensity of hamstring activation. The exercises performed in the sitting position and the functional exercises weakly activated hamstring muscles in contrast with the eccentric and isometric analytical exercises.

Discussion.– The functional exercises studied can be proposed very early to control the knee. However, they are by consequence weakly effective to restore hamstring muscular strength. Analytical exercises should be integrated into the program of rehabilitation but later if these must be performed after knee trauma or knee surgery.

Further reading


Muscular strength recovery after revision knee ligamentoplasty

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Keywords: Isokinetic; Anterior Cruciate Ligament; Revision

Objective.– To measure the knee isokinetic strength recovery after a revision of an anterior cruciate ligament reconstruction.

Method.– Thirty-nine revisions (23 by hamstring procedure [STG], 10 by ipsilateral patellar tendon procedure [iPT] and 6 by contralateral patellar tendon procedure [cPT]) were compared with 78 primary plastics [46 STG and 32 PT procedures]). The recovery of the muscular strength was measured at 4, 6 and 12 months post-surgery.

Results.– The strength deficit at 12 months post-surgery after revision was comparable with that of a primary ligamentoplasty performed according to the same procedure. On the other hand, at 4 and 6 months post-surgery, the extensors deficit was lesser after the hamstring procedure revision (25% ± 16 vs 37% ± 16; P < 0.001) and after the iPT procedure revision (41% ± 11 vs 17% ± 17; P < 0.001).

Discussion.– Our results at 12 months post-surgery are comparable with those observed during cohort cross sectional studies with a long follow-up. The weak extensors deficit after the STG procedure can be explained by a program of rehabilitation which was less intense because of lesser challenge to recover sports activity. For the cPT procedure, the weak extensors deficit is explained by a knee graft deficit which persists at least until 6 months post-surgery.

Conclusion.– The muscular isokinetic deficits after revision are similar to those evaluated after the primary ligamentoplasties using the same surgical procedure.

Further reading


Kinematics during a sidestep manoeuvre in handball: Study of the influence of gender

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Keywords: Anterior cruciate ligament; Biomechanics; Direction change; Sport; Handball; Gender

Introduction.– Anterior cruciate ligament (ACL) tear is a common injury in handball with a risk 3–5 times higher among women [1]. The sidestep manoeuvre
is a specific technique movement in handball with a change of direction. It is
the main circumstance of ACL injury in this sport [2]. The purpose of this
study was to describe and compare, across gender, knee kinematics and angular
placement of the whole body during an unconstrained manoeuvre. The null
hypothesis was no difference across gender in the axial rotations of the pivot
knee during the stance phase.

Patients and methods. – Fifteen females and fourteen males executed the same
sidestep manoeuvre. All were trained to practice this manoeuvre in their federal
handball structure. Spatio-temporal data and kinematics of the pivot knee, ipsi-
lateral foot and hip, pelvis and trunk were calculated using a 3D motion analysis
system Vicon. A Mann-Whitney test was used to compare data.

Results. – The gesture was analyzed highly reproducible despite the absence of
constraint. At initial contact, men had a higher instantaneous speed. The duration
of the stance phase was similar. No gender significant difference was found in
the axial rotation of the knee during the pivoting stance phase. At initial contact,
women exhibited less knee flexion and more knee valgus. Pelvis rotation was
greater in men. Gender differences were also found during the stance phase in
knee frontal plane and in the hip transverse plane.

Discussion. – The observed knee postures suggest an increased ACL injury risk
at initial contact in women. A prevention work could be proposed to decrease the
risk. Relationships between knee and hip seem important.

References

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Orthopaedic surgical wounds in physical and rehabilitation medicine ward
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Keywords: Surgical wound; Surgery; Dressing; Rehabilitation

Background. – How long surgical wound should be dressed is a matter of local
preference and habits. Maintaining such the dressing creates discomfort for the
patient and increased care burden for nurses.

Objective. – Evaluate orthopaedic surgical wound healing (non-resorbable
stitches or staples) according to local treatment and assess nursing and reha-
bitation care.

Method. – To take off wound dressing as soon as possible when entering the PRM
ward, if there is no risk to the patient (incontinence, behavioral disorders) and
with the patient’s agreement, after developing an interdisciplinary ward meeting
procedure based on a literature review (1980–2010). To assess the consequences
for the patient and for the care team.

Results. – Hundred and one patients, mean age 64 years, hospitalized in our
PMR ward between 06/14/10 and 02/28/11, had 103 surgical procedures. All
patients had a dressing at the admission 6.6 days postoperative. Seventy-nine
incisions are left undressed (76%) on average 1, 5 days after admission. The
stitches were removed at 15.8 days post-surgery. Twenty-four surgical wounds
were kept dressed, 2 on patient’s demand. The stitches are removed at 16.6 days
post-surgery. All patients healed without dehiscence or local infection. Deep
sepsis after fixation of the acetabulum was externalized secondarily. The results
are similar after planned surgery or after trauma surgery.

Discussion–Conclusion. – A review of the literature shows that there is no inter-
est in maintaining a dressing beyond the third postoperative day. In our study,
early dressing removal did not cause local infection. In addition, wound moni-
toring was easier, massage began earlier, washing was easier and daily life more
comfortable for the patient. Nursing care burden decreased: reduction of at least
one dressing per patient per stay (reduction of material and nursing time), easy
removal of stitches/or staples. Efficiency increased.

Further reading

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Apport de l’isocinétisme dans la prise en charge rééducative du syndrome fémoroapatellaire
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Mots clés : Isocinétique ; Syndrome fémoroapatellaire ; Évaluation ;
Rééducation ; Genou

Introduction. – Les dynamomètres isocinétiques sont largement utilisés dans la
pathologie articulaire et musculaire. De nombreuses équipes ont utilisé cette
technique pour l’évaluation de l’équilibre musculaire du genou et aussi pour
etablir des protocoles de prise en charge rééducative selon la pathologie sous-
jacente.

Nous nous sommes intéressés au cas particulier du syndrome fémoroapatellaire.
Il s’agit d’un syndrome clinique fréquent, au cours duquel l’hypothèse d’un
éventuel déséquilibre musculaire est de plus en plus soutenue.

Nous nous proposons d’étudier dans un premier temps l’équilibre musculaire du
genou chez des sujets présentant un syndrome fémoroapatellaire clinique, puis
dans un deuxième temps, de comparer la force de l’équilibre musculaire du genou
de patients présentant ce syndrome avant et après rééducation isocinétique.

Patients et méthodes. – Il s’agit d’une étude rétrospective incluant 36 malades
susceptibles de la consultation externe pour syndrome fémoroapatellaire. Tous les patients
ont bénéficié d’une évaluation isocinétique des genoux sur un dynamomètre
BIODEX aux vitesses de 60°, 120° et 180°/s. Vingt de ces 36 patients ont suivi
une rééducation isocinétique des genoux adaptée à l’évaluation.

Résultats. – Un déficit de la force musculaire des ischio-jambiers a été noté chez
26 patients. Le déficit musculaire du quadriceps a été noté chez 17 patients. Un
déséquilibre musculaire a été noté chez 31 patients : en faveur du quadriceps chez
20 patients et en faveur des ischio-jambiers chez 11 patients. Chez les 20 patients
ayant bénéficié d’une rééducation isocinétique, un gain de force musculaire,
aussi bien du quadriceps que des ischio-jambiers a été noté dans tous les cas.
Une correction statistiquement significative du ratio agoniste/antagoniste a été
observée chez 77,77 % des patients.

Conclusion. – Le syndrome fémoroapatellaire est d’origine multifactorielle.
En dehors des anomalies osseuses, les facteurs musculaires : faiblesses, rétractions
et/ou déséquilibre musculaire sont primordiaux. Les protocoles isocinétiques
constituent un complément utile des méthodes classiques d’évaluation et de
rééducation utilisées.

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