Isokinetic profile of subjects with proximal patellar tendinopathy

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Introduction: Proximal patellar tendinopathy is relatively common among sportsmen, even among football players who do repetitive shooting sessions. However, the strength profile of subjects with proximal patellar tendinopathies is rarely described and the isokinetic profile remains unknown.

Purpose: We aimed to determine the strength profile of subjects suffering from this frequently recurrent pathology.

Methods: Forty-three players (29,1±8.5 y.o.; 78.1±11.9kg; 179.3±7.2cm) with chronic proximal patellar tendinopathy confirmed by ultrasounds were recruited. Quadriceps and hamstrings muscular performances of the healthy and pathological side were measured using an isokinetic dynamometer (Cybex Norm) at the concentric speed of 60°/s (C60) and 240°/s (C240) and at the eccentric speed of 30°/s (E30 - only for hamstrings). A visual analogic scale of pain (VAS) has also been used after each isokinetic test in order to associate the level of complaints and the intensity of contractions.

	PS 43 knees	HS 43 unes	p
Q Conc 60°/s (N.m/kg)	2.17 ± 0.68	2.47 ± 0.55	0.0003
Conc 240°/s (N.m/kg)	1.46 ± 0.42	1.56 ± 0.31	0.02
Ecc 30°/s (N.m/kg)	2.46 ± 0.91	2.79 ± 0.96	0.0008
Hamst Conc 60°/s (N.m/kg)	1.26 ± 0.37	1.37 ± 0.36	0.006
Hamstr Conc 240°/s (N.m/kg)	0.80 ± 0.23	0.85 ± 0.20	0.04
VAS Conc 60°/s	3.47 ± 2.65	0.20 ± 1.05	< 0.01
VAS Conc 240°/s	2.83 ± 2.47	0.10 ± 0.68	< 0.02
VAS Ecc 30°/s	5.26 ± 2.78	0.58 ± 1.93	< 0.03

Table 1: Isokinetic results

Results: The results (Table 1) for the isokinetic tests comparing the healthy (HS) to the pathological side (PS) are significant for the different conditions of contraction and test speeds, as for the results of the VAS associated to those tests ($p<0.01$). Indeed, pathological limbs had a maximum peak torque for the quadriceps at C60 and at C240 lower than healthy limbs (2.17 ± 0.68 N.m/kg vs 2.47 ± 0.55 N.m/kg, $p = 0.0003$ and 1.46 ± 0.42 N.m/kg vs. 1.56 ± 0.31 N.m/kg, $p = 0.02$, respectively); this represents a bilateral difference of 14% for C60 and 7% in C240. In E30, pathological limbs were also weaker than the healthy limbs (2.46 ± 0.91 N.m/kg vs 2.79 ± 0.96 N.m/kg, $p = 0.0008$) which represents a difference of 13% between healthy and pathological limbs. For the hamstrings of the pathological limbs, we observed a maximum peak torque at C60 and C240 lower than for the hamstrings of the healthy limbs (1.26 ± 0.37 N.m/kg vs. 1.37 ± 0.36 N.m/kg, $p = 0.006$ and 0.80 ± 0.23 N.m/kg vs 0.85 ± 0.20 N.m/kg, $p = 0.04$). The bilateral differences of hamstring strength were 8.7% in C60 and 6% in C240. The PS were more painful than the HS (VAS C60: 3.47 ± 2.65 vs 0.20 ± 1.05; $p>0.01$; VAS C240: 2.83 ± 2.47 vs. 0.68 ± 0.10; $p>0.01$; VAS E30: 5,26 ± 2.78 vs 0.58 ± 1.93; $p>0.01$). The difference of pain can be seen especially in eccentric mode. This observation suggest that isokinetic tests, beyond the measure of strength, could represent a pain provocation test, even with a possible pronostic value for the efficacy of treatment.

Conclusions: In our study, the isokinetic results of patients with proximal patellar tendinopathy showed a significant difference in strength profile between the HS and the PS as well as VAS associated with each tests. However, the diversity of outcomes recorded in our population suggests that an individualized rehabilitation treatment is probably more relevant than a common protocol for the healing of this tendon pathology. Isokinetic tests can also represent a tool for assessment of treatment planning. Finally, it would seem that isokinetic tests in the eccentric mode on the quadriceps can be a pain assessment tool for the pathological tendon.