Results: Preoperatively, the tibia located anteriorly and rotated internally in the ACL-deficient knee in both groups. At 3 weeks postoperatively, the tibia in 10-N group / 20-N group located 1.2 ± 1.0 mm / 2.3 ± 1.4 mm posteriorly and externally rotated $1.7 \pm 1.5°$ / $4.4 \pm 2.5°$. The posterior shift and external rotation were significantly smaller in 10-N group than in 20-N group. The tibia at 6 months located quite close to the normal position in both groups. The side-to-side difference of KT value was 0.3 ± 1.0 mm in 10-N group and 0.2 ± 1.0 mm in 20-N group, with no significant difference.
Conclusion: Excessive initial tension led to the abnormal tibiofemoral relationship and increased the tibiofemoral joint load. As the difference from the normal tibial position in 10-N group was smaller at 3 weeks in this study, an unnecessary load to tibiofemoral joint might be less at 3 weeks. Thus, the smaller initial tension prevented the tibial over-constrained position, while it provided a favorable tibiofemoral relationship as well as anterior knee laxity 6 months postoperatively.
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B0107

Simultaneous ankle arthroscopy and hindfoot endoscopy for combined anterior and posterior ankle impingement syndrome in professional athletes

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Background: Both anterior ankle impingement syndrome (AAIS) and posterior ankle impingement syndrome (PAIS) are likely to affect athletes who engage in certain common sports activities, but there has been almost no report which showed the effectiveness of simultaneous surgery for both conditions.
Purpose: To evaluate the clinical outcome of simultaneous low-invasive ankle arthroscopy and hindfoot endoscopy for combined AAIS and PAIS in professional athletes.
Methods: Between October 2009 and October 2011, 12 feet of 9 professional athletes (8 men, 1 woman; mean age, 25 years; range, 19−34 years) with combined AAIS and PAIS underwent simultaneous ankle arthroscopy and hindfoot endoscopy. Radiography, computed tomography, and magnetic resonance imaging were performed. Ultrasound-guided anesthetic injection was administered for diagnosis of PAIS. The active plantar and dorsal flexion angles of the ankle before and after surgery, occurrence of complications, and time to return to competitive sport were evaluated.
Results: All feet had osteophytes in the anterior ankle joint. Os trigonum and a large posterior talar process were found in 8 and 4 feet, respectively. Combined disorders were lateral ankle instability in 6 feet and osteochondral lesion of the talus in 4 feet. Median active plantar and dorsal flexion angles improved significantly from 40° (range, 30−50°) and 10° (range, 5−20°) before surgery to 50° (range, 40−55°) and 15° (range, 10−20°) after surgery, respectively ($p<0.01$ and $p<0.05$, respectively). One patient complained of numbness in the vicinity of the sural nerve which resolved spontaneously by 4 weeks after surgery. Median time to returning to competitive sport was 12 weeks (range, 12−15 weeks).
Conclusion: Simultaneous ankle arthroscopy and hindfoot endoscopy for combined AAIS and PAIS enables professional athletes to return to athletic activity.
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B0114

Confirmed presence of bacterial 16S rRNA in Achilles' tendon rupture samples

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Introduction: Tendinopathy continues to be a growing concern in the orthopaedic arena, with various theories about its aetiopathogenesis and, given the insidious nature of the disease, it is this information about the early stages of the disease that we lack in order to make significant advancement in the treatment of this disease. Myocarditis is often caused by viruses and bacteria, and it is this microbial involvement that causes degradation of the supportive collagen matrix [1], as well as the activation of nucleotide-binding oligomerization domain (NOD) proteins that can cause cardiac dysfunction, fibrosis and apoptosis [2], similar to features observed in tendinopathy. We previously demonstrated [3] that NOD1 was significantly more prevalent in tendinopathy samples than in healthy samples, as well as demonstrating that *in vitro* tendon-derived stem cells responded to diaminopimelic acid (DAP; a bacterial NOD antagonist) with a pro-inflammatory response. There have been at least two reported cases of tendinopathy associated with *Borrelia burgdorferi* (Lyme disease) [4,5] and one reported case caused by *Mycobacterium tuberculosis* [6]. We aim to detect the presence of 16S rRNA, a highly conserved gene-coding region in bacteria in human tendinopathy samples.
Methods: In an ongoing study, 24 Achilles' tendon rupture samples were collected that displayed evidence of tendinopathic changes (confirmed by MRI) and 24 healthy hamstring samples were collected from ACL reconstruction grafts under sterile conditions (Approved by the Clinical Research Ethics Committee of the authors' institution; Ref no.: CRE-2013.479). Genomic DNA was extracted from all samples and universal 16S primers (27F and 1492R; Invivogen©) were used to conduct PCR in order to confirm the presence or absence of bacterial 16S rRNA (confirmed by agarose gel electrophoresis). *Escherichia coli* was used as a positive control, while a blank reagent was used as a negative control. The Fisher's exact test was used to determine whether there were significant differences between the number of 16S rRNA positive cases in the tendinopathy group and the healthy tendon group, as well as the female: male gender distribution differences between the tendinopathy and healthy groups. A t-test was used to determine whether there was a significant difference in ages between the tendinopathy group and the healthy tendon group. p-value<0.05 was considered significant.
Results: Eight of the 24 Achilles' tendinopathy samples were positive for 16S rRNA presence (33.3%; confirmed by gel electrophoresis) while no healthy hamstring tendon samples were positive for 16S rRNA presence. The Fisher's exact test demonstrated that there were significantly more tendinopathy samples with 16S rRNA presence than in the healthy tendon group ($p=0.004$). The tendinopathy group was significantly older than the healthy tendon group ($p<0.001$) and there was no significant difference in gender between the tendinopathy group as compared to the healthy tendon group ($p=0.494$).
Discussion: We are the first to demonstrate the presence of bacterial 16S rRNA in human Achilles' tendinopathy. Contamination was avoided through sterile sampling and experimental techniques, which was confirmed by the negative controls in which 16S rRNA was not detected. The significant difference of ages between the tendinopathy and healthy groups does not affect the presence of 16S rRNA. This study demonstrates that bacterial 16S rRNA is more prevalent in tendinopathy samples; however, a causal relationship between the presence of bacteria and the development of tendinopathy must be confirmed by future animal studies. We also need to determine the bacterial species through DNA sequencing in order to determine whether a diverse number of species are present in tendinopathy, such as *B. burgdorferi, M. tuberculosis* or even other bacteria such as *Propionibacterium acnes* (which has been shown to contribute to joint disease) [7], or if the bacteria detected belong to similar families or classes. Only the presence of bacteria in Achilles' tendinopathy has been studied, and more thorough sampling and experiments are required to assess various other microbes such as viruses that may be present in the Achilles' tendon, as well as other tendon regions. These results also support our previous study on NOD1, demonstrating that bacteria present in tendinopathy samples may activate NOD1 pro-inflammatory pathways.
Significance: This study opens up a novel aspect in the aetiopathogenesis of tendinopathy. It serves as a positive basis to expand this study that may lead to greater insight into new diagnostic and treatment options.
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B0129

Applied anatomy of anterior cruciate ligament with direct tibial arc-shaped insertion site

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Objective: To observe the anatomical morphology of the tibial insertion of the anterior cruciate ligament (ACL) in Chinese adults so as to offer theoretical guidance for ACL reconstruction and meniscus transplantation.
Methods: Fifteen adult cadaveric knees (8 left knees and 7 right knees) were dissected, including 10 males and 5 females, with an age ranged from 25 to 47 years (mean, 32.4 years). All knees were generally observed through standard medial parapatellar approaches, then the ACL midsubstance and the tibial insertion (direct and indirect insertions) were anatomically measured.
Results: In all specimens, the ACL was flat with a lot of fine fibers. The anteromedial bundle and posterolateral bundle could be observed in 13 of 15 knees. However, no obvious bundles were found in 2 knees. The arcshaped tibial direct insertion started at the medial tibial eminence and ended at the anterior horn of the lateral meniscus. The width of the arc was (11.2 ± 2.4) mm; the thickness was (3.0 ± 0.3) mm; and the cross-sectional area was (28.8 ± 7.8) mm2. And the left-right diameter of the whole insertion was (9.5 ± 1.8) mm; anteroposterior diameter was (11.9 ± 0.6) mm; and the cross-sectional area was (117.8 ± 12.5) mm2. The width of the anterior horn of lateral meniscus was (12.3 ± 2.0) mm. The anterior horn of lateral meniscus was surrounded by arc-shaped direct insertion in the middle, and its fibers were partly intertwined with indirect insertion of ACL.
Conclusions: Anatomical ACL reconstruction may therefore require a arc-shaped tibial footprint. There are overlap covering relationship between the attachment location of anterior horn of the lateral meniscus and tibial insertion of ACL. It should pay more attention to protecting tibial insertion of ACL in lateral meniscus transplantation.
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