

## New "Freer test" for assessment of syndesmotic diastasis -Cadaveric study

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**Introduction/Purpose:** Syndesmotic stability is usually assessed arthroscopically by an arthroscopic probe insertion between the anterolateral tibio-fibular recess. This probe test can predict the syndesmotic instability, however, is difficult to determine syndesmotic fixation. The syndesmosis has dynamic motion and fairly firm structure, 2 mm thin probe cannot make syndesmotic dynamic diastasis. We proposed a new "Freer test" for diagnosis of syndesmosis injury which performed to insert a 2 mm diameter freer elevator between tibio-fibular lateral gutter while keeping the ankle at the plantigrade. The purpose of the present study was to evaluate the diagnostic value of freer test for anterior inferior tibiofibular ligament (AITFL) complete tear, interosseous ligament (IOL) tear and Weber type B fibular fracture.

**Methods:** Ten fresh ankle cadaveric specimens were used. Operative procedures progressed as below; firstly, exposed antero-lateral ankle joint with direct lateral longitudinal incision, incised AITFL, incised IOL, performed Weber type B osteotomy at fibular, fixed the osteomized fibular with 8-hole locking plate and fixed the AITFL with suture anchors. In each procedure, freer tests with ankle dorsiflexion (DF, plantigrade) and plantarflexion (PF) were performed with freer elevator linked 3 kgf compression gauge. A negative test was defined as the freer did not insert with a more than 3 kgf. A positive test was defined lesser than 3 kgf, and measured the force at the insertion.

**Results:** All freer test was negative with DF before procedures. Six ankles with PF were positive with average 1.5 kgf. All freer test positive has shown after AITFL cutting in DF, PF(mean 1.76 kgf, 1.19 kgf). After IOL cutting, all freer tests were positive in DF, PF(mean 1.46, 0.79 kgf). After fibular osteotomy, all freer tests were positive in DF, PF (mean 0.83,0.18 kgf). After fibular fixation with plate, all freer tests were positive in DF, PF (mean 1.26, 0.97 kgf). After syndesmotic fixation with anchors, 8 freer tests were positive in DF. 2 negative in PF, 4 negative in PF and 6 positive in PF. 2 positive in DF had partial breakage on anchor footprint due to weak bone.

**Conclusion:** The "freer test" is useful diagnostic tool which test positive means AITFL rupture.




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