

Oral presentation

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Pressure profile changes after cartilage biopsy at the postero-medial rim of the talar dome

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Introduction

Autologous chondrocytes implantation is a promising technique to treat joint surface defects of the talar dome, especially when it is considered that a complete arthroscopic procedure is available yet [1]. However, the exact biopsy site as source of the cells to be expanded remains an issue of debate. Recently we showed that a limited biopsy can be harvested reliably and consistently at the postero-medial rim of the talar dome by arthroscopy [2]. Further research must establish if this location is indeed a "lesser weight bearing area". This study aims to determine the changes occurring in the pressure profile across the aforementioned site after a biopsy has been harvested.

Methods

Ten fresh frozen ankle specimens were tested. An anterior and posterolateral arthrotomy were used. Reference points just next to the articular cartilage were created. A template of the talar dome was made to shape the custom-made units of sealed pressure sensitive film. Specimens were mounted in a testing machine, the foot fixed on a custom-made tilting platform to allow positioning of the tibio-talar joint in neutral (N), 10° of plantar flexion (PF) or 10° of dorsiflexion (DF). Applied loads consisted of 2.5 times body weight in N and DF, and 1.5 times body-weight in PF. The tests were performed before and after harvest of a postero-medial cartilage biopsy of 5 × 11 mm. The images were further analysed in the ImageJ environ-

ment. Digital photographs of the posterior side of the joint in each position were taken after harvest to study the relationship of the created defect to the tibial plafond. The pressure profile at the biopsy site was determined by scanning the stains across this zone in an antero-posterior direction and converting the grey values in pressures with aid of a calibration curve. The plots of each pre and post biopsy situation were analysed for significant changes. The photographs were analysed to determine the amount of coverage of the biopsy by the tibial plafond. Pre and post biopst stains were macroscopically analysed to detect any change in shape and any possible outline of the biopsy visible. Finally, all results were compared to cross-check for significant findings.

Results

Possibly significant changes in the pressure profile were noted twice in N and 5 times in PF, consisting of a lower pressure across the biopsy site after harvest. The pressure change ranged from 0.4 – 1.3 MPa. A rebound effect with pressures exceeding the pre biopsy level was never seen. In all other tests the pressure plots run parallel, although in some cases not superimposed. In the latter the highest pressure was seen both pre and post biopsy, the difference never exceeding 0.5 MPa. The biopsy site resulted (partially) covered by the tibial plafond 3 times in N and 8 times in PF. A change in the shape of the contact area or in the outline of the biopsy was seen 7 times in PF. After

comparing all results a limited effect of the biopsy on the pressure profile was seen in PF in 6 specimens.

Conclusion

In only a part of the specimens a change in the local pressure profile was seen, after harvesting a postero-medial cartilage biopsy of 5 × 11 mm. All changes consisted in a lower pressure registered across the biopsy site and no peak pressures near to the biopsy site developed. Moreover all changes were in PF. In this position the joint is loaded only a short time during the stance phase and only in a limited way [3]. Therefore, currently the investigated biopsy site seems safe to be used in clinical practice.

References

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