Universität Basel

Publication

Mineralisation patterns in the subchondral bone plate of the humeral head

PURPOSE: Pathologic changes of the glenohumeral joint, like a long-standing overloading or an accident often lead to severe glenohumeral osteoarthritis, and a glenohumeral joint replacement could be necessary. Joint instability and glenoid loosening are the most common post-operative complications, which can be caused by eccentric loading of the glenoid, if the humeral head is malcentered. If these malcentered cases could be identified pre-operatively, the pathologic position of the humeral head could be fixed intra-operatively and complication may be prevented. Computed tomography osteoabsorptiometry (CT-OAM) is a useful method to determine the distribution of mineralisation in the subchondral bone as a marker for the long-term loading history of a joint. The objective of this study was to gain information about the mineralisation distribution in the subchondral bone plate of the humeral head. METHODS: By the use of CT-OAM, the distribution of the subchondral mineralisation of 69 humeral heads was investigated and groups of mineralisation patterns were built. To evaluate if differences in age exist, the mean values of the two groups were compared using t test. RESULTS: 49 humeral heads (71% of 69 specimens) showed bicentric subchondral mineralisation patterns with ventral and dorsal maxima, 20 humeral heads (29% of 69 specimens) could be classified as monocentric with a centro-dorsal maximum. We found no statistical significant difference between the age of the monocentric and the bicentric group on a significance level of 95%. CONCLUSION: We could show that stress distribution at the humeral head is typically bicentric with a ventral and dorsal maximum. However, other mineralisation patterns may occur under pathologic circumstances. The pre-operative identification of such cases by the use of CT-OAM could help to improve the post-operative results in shoulder surgery.