

Publication**Mineralisation and mechanical strength of the glenoid cavity subchondral bone plate****JournalArticle (Originalarbeit in einer wissenschaftlichen Zeitschrift)****ID** 1194563**Author(s)** Kraljević, Marko; Zumstein, Valentin; Wirz, Dieter; Hügli, Rolf; Müller-Gerbl, Magdalena**Author(s) at UniBasel** [Hügli, Rolf](#) ; [Müller-Gerbl, Magdalena](#) ;**Year** 2011**Title** Mineralisation and mechanical strength of the glenoid cavity subchondral bone plate**Journal** International orthopaedics**Volume** 35**Number** 12**Pages / Article-Number** 1813-9**Keywords** Aged; Aged, 80 and over; Arthroplasty, Replacement/methods; Biomechanics; Bone Density; Bone Plates; Cadaver; Calcification, Physiologic; Compressive Strength; Equipment Failure Analysis; Female; Glenoid Cavity/ metabolism/surgery; Humans; Male; Middle Aged; Osseointegration; Prosthesis Failure; Shoulder Joint/surgery

PURPOSE: Failures in total shoulder replacements are often due to aseptic loosening of the glenoid component; the subchondral bone plate is an important factor governing primary fixation of implant materials. Therefore, we investigated characteristic mineralisation patterns of the subchondral bone plate, which demonstrate long-term stress on articular surfaces, age-related changes, postsurgical biomechanical situations and regions of fixation. Using computed tomography osteo-absorptiometry (CT-OAM), these distribution patterns can be demonstrated in vivo. The aim of this study was to investigate the relationship between subchondral bone-plate mineralisation measured with CT-OAM and the mechanical strength measured by indentation. **METHODS:** A total of 32 cadaverous glenoid cavities were evaluated by CT-OAM and indentation testing. Linear regression was used to compare mineralisation and strength of the subchondral bone plate. **RESULTS:** Results showed two patterns of mineralisation distribution. Twenty-eight cavities were related to bicentric distribution pattern and four showed a single maximum. The correlation coefficient between CT-OAM density and subchondral bone-plate strength was determined to be between 0.62 and 0.96 ($P < 0.02$). **CONCLUSIONS:** Long-term stress affects not only the subchondral but also the underlying cancellous bone. It therefore can be assumed that mineralisation patterns of the subchondral bone plate continue in cancellous bone. Areas of high density could serve as anchoring locations for orthopaedic implants in resurfacing the glenoid cavity.

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