

Tendon contains more stem cells than bone at the rotator cuff repair site.

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Abstract

BACKGROUND: The rotator cuff (RC) repair failure rate is high. Tendon and bone represent sources of mesenchymal stem cells (MSCs), but the number of MSCs from each has not been compared. Bone channeling may increase bone-derived **MSC** numbers participating in enthesis re-formation at the "footprint" repair site. The effect of preoperative channeling on increasing bone **MSC** numbers has never been reported. We asked (1) whether bone contains more MSCs than tendon at the time of arthroscopic repair and (2) whether bone preoperative channeling at the RC repair site increases the number of bone-derived MSCs at the time of surgery.

METHODS: In 23 participants undergoing arthroscopic RC repair, bone was sampled from the footprint and tendon was sampled from the distal supraspinatus. We randomized participants to the channeling or no-channeling group 5 to 7 days before surgery. We enumerated MSCs from both tissues using the colony-forming unit-fibroblast (CFU-F) assay (10 per group). We identified **MSC** identity using flow cytometry and **MSC** tri-differentiation capacity (n = 3).

RESULTS: Tendon CFU-F per gram exceeded bone CFU-F per gram for both groups (479 ± 173 CFU-F/g vs. 162 ± 54 CFU-F/g for channeling [P = .036] and 1334 ± 393 CFU-F/g vs. 284 ± 88 CFU-F/g for no channeling [P = .009]). Ninety-nine percent of cultured cells satisfied the **MSC** definition criteria.

CONCLUSIONS: The distal supraspinatus tendon contained more MSCs per gram than the humeral footprint. Tendon may represent an important and overlooked **MSC** source for postoperative enthesis re-formation. Further studies are needed to evaluate the repair role of tendon MSCs and to recommend bone channeling in RC repair.

KEYWORDS: Mesenchymal stem cells; anchor repair; arthroscopy; bone channeling; enthesitis; rotator cuff; tendon

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