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Comparative analysis of autologous chondrocyte implantation and other treatment modalities: a systematic review

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Purpose: The purpose of this systematic review was to analyze and determine the effectiveness of Autologous Chondrocyte Implantation (ACI) when compared with other treatment modalities which includes microfracture, mosaicplasty, abrasionplasty, bone marrow derived mesenchymal stem cell (BMSC) and matrix assisted autologous chondrocyte implantation (MACI).

Methods: Literature search using online databases PubMed, Scopus, National Institute for Clinical Excellence (NICE) and Cochrane Controlled Trial Register regarding all cell based therapies and other interventions for chondral lesions was explored. Data on clinical outcome and repair quality were analyzed. Duplicates and irrelevant articles were omitted. **Result:** Seventeen (n=17) studies were included in this review. Among the four trials on ACI versus mosaicplasty, 2 studies showed no differences in clinical scores, 1 suggested similar performance while the other suggested better results in tissue quality for ACI. A systematically performed assessment comparing ACI with microfracture shows better clinical outcomes and higher tissue quality after ACI. Studies comparing ACI with MACI or BMSC demonstrated similar results. Although many of these studies had substantial flaws, on the overall, the evidence comparing ACI with other treatment modalities shows better clinical outcomes and higher tissue quality.

Conclusion: Despite significant differences between the methodologies employed by different researchers, we can conclude that all except 2 studies demonstrated ACI being the better treatment for cartilage defects. However final conclusions regarding long-term effects are still difficult and therefore future studies are needed to answer the long term effects of ACI.