Chondral Pathology: Which Lesions to Debride & Techniques of Debridement

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Articular cartilage is avascular, aneural and harbours a sparse population of cells (Chondrocytes) which can only mount a very limited healing response. Chondral debridement or Chondroplasty remains the most commonly undertaken arthroscopic cartilage procedure[1] in the world despite a lack of defined indications and clinical evidence.

1 Which Lesions to Not to Debride
Evidence in Level 1 RCT’s suggest that Arthroscopic Debridement in Knee OA is of no benefit[2][3]. While criticism of selection bias exists[4], this Level 1 evidence suggests Chondroplasty in patients with non-mechanical symptoms, diffuse OA with radiographic narrowing, mal-alignment, recent symptoms onset is not indicated.

2 Which Lesions to Debride
Removal of unstable articular surface will not transform a degenerative surface into a “normal” or “healthy” articular surface. The vast majority of damaged chondral surfaces are best treated with observation unless the lesion is clearly symptomatic. There is no evidence Chondroplasty or chondral debridement is prophylactic against disease progression[7].

While there is a paucity of high level studies in clinical cartilage research[5], Chondroplasty can be considered in patients who have failed rehabilitation, with focal mechanically unstable ICRS Grade II & III lesions, in the absence of diffuse OA or mal-alignment or joint space narrowing.

The presence of symptomatic meniscal tears that have failed non-surgical management is not a contra-indication[6].

3 Techniques of Debridement
Chondral debridement can be achieved via mechanical (Shaver / Punch) or Radiofrequency (RF) (Monopolar/ Bipolar) devices. Evidence suggests that compared with classical mechanical debridement, radio- frequency currently appears to be the superior method for achieving a good midterm result[8]. The mechanism of this superior outcome is uncertain, however less friction due to decreased surface roughness has been postulated[9]. Osteonecrosis risk appears to be low with bipolar radio- frequency[10], however a narrow thermal safety band exists as chondrocyte necrosis occurs over 50 degrees Celcius.

Monopolar and Bipolar Radio-frequency probes ablate tissue via a focally intense plasma layer at the tip of the active electrode, causing local chondrocyte death. Debate exists if Bipolar RF devices cause deeper and wider Chondrocyte necrosis than monopolar[11], with some authors suggesting it is technique dependent[12]. Some degree of Chondrocyte necrosis at the device application site appears to be inevitable. Hence great care should be taken using a temperature regulated device and light touch only. It should be noted that A) The the stated margin of error (50° +/- 5°) of some temperature regulated RF devices exceeds the temperature at which chondrocyte death occurs[13].

4 Summary
Due to a paucity of robust evidence, Chondroplasty should be limited to small focal mechanically unstable Grade II & III ICRS lesions in aligned knees without radiographic joint space narrowing that have failed non-operative management. Great care needs to be undertaken when using Radiofrequency devices on local articular surfaces due to unavoidable but technique variable chondrocyte necrosis.


