

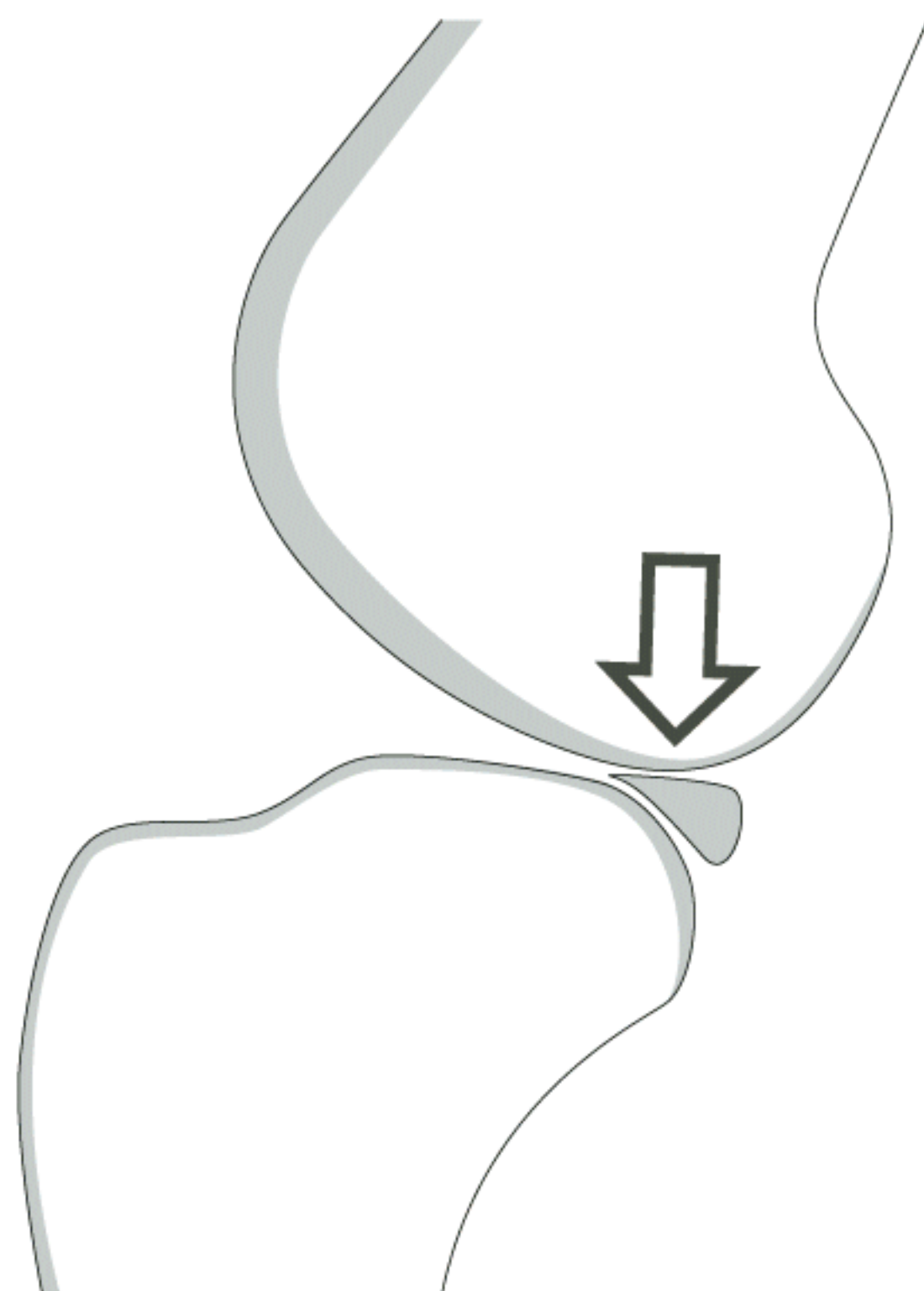
Tears of the Posterior Functional Segment of the Medial Meniscus – Four Pathophysiological Models

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“Mental models are constructs which, with the addition of verbal interpretations, describe observed phenomena. The justification is solely and precisely that they are expected to work.” (John von Neumann)

1. The instability model

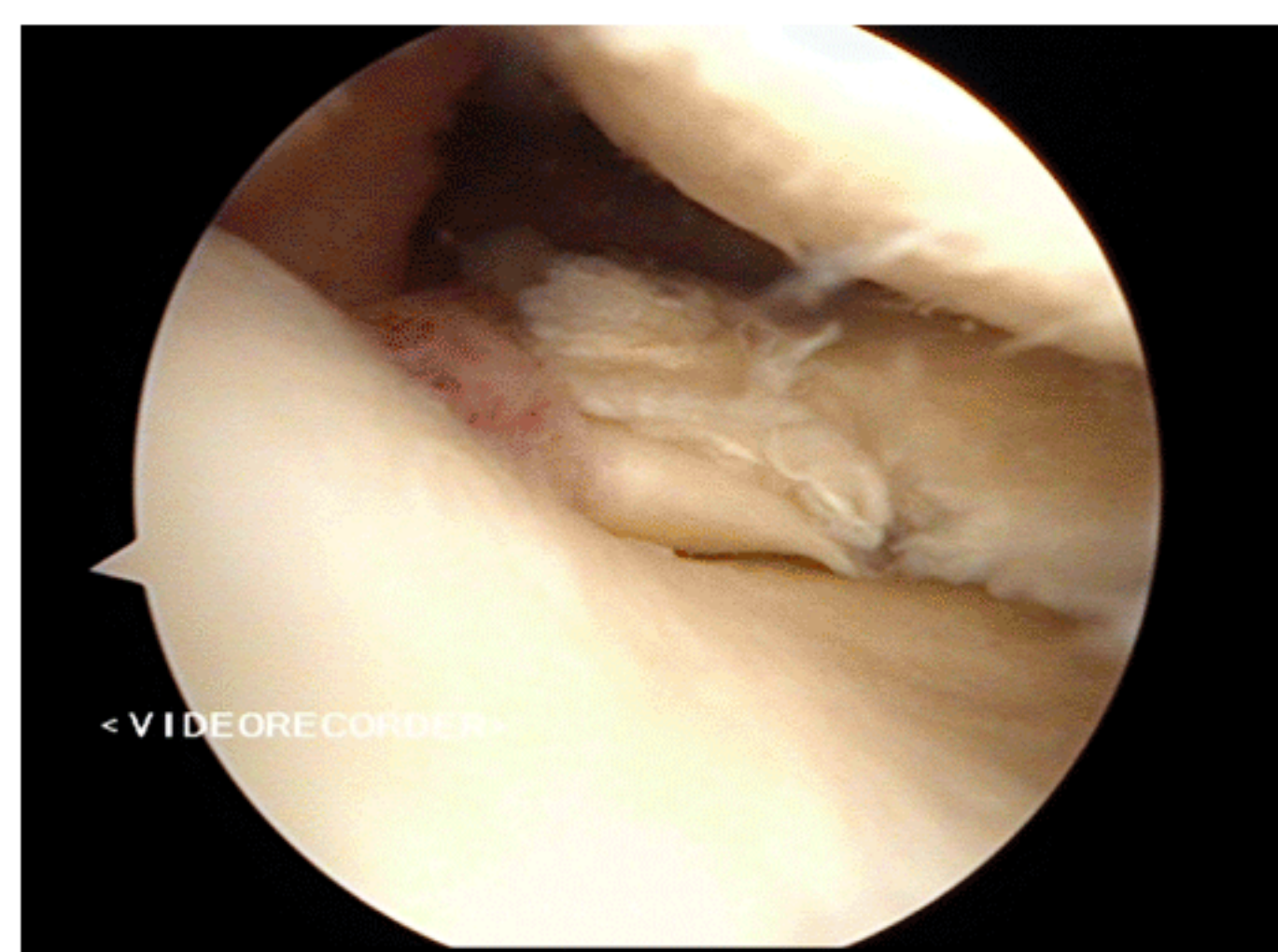
The anterior translation of the medial tibial condyle compresses the posterior horn of the meniscus leading to longitudinal tears and avulsion injuries of the posterior root of the meniscus. These tears can be seen in patients with ACL injuries.



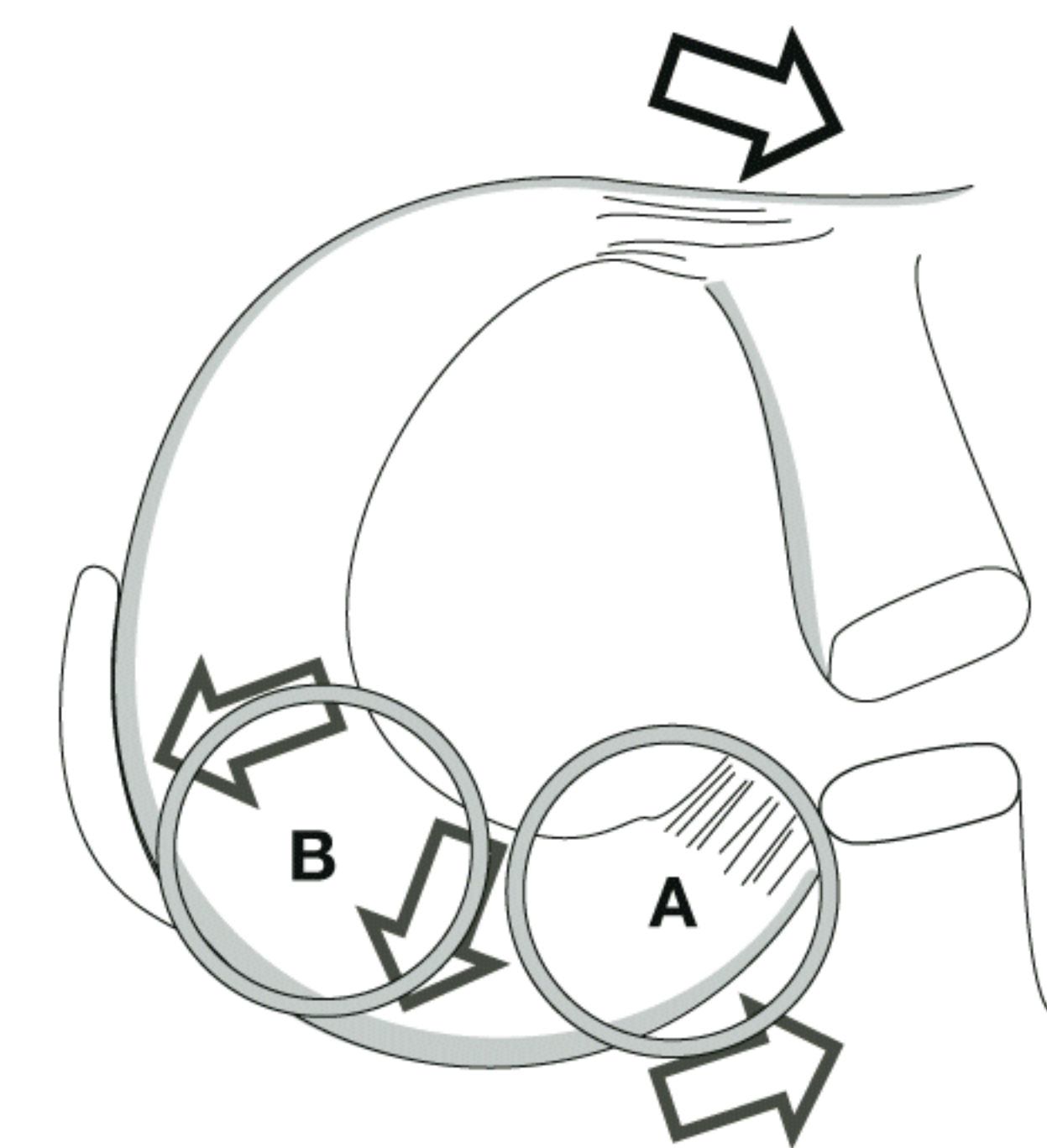
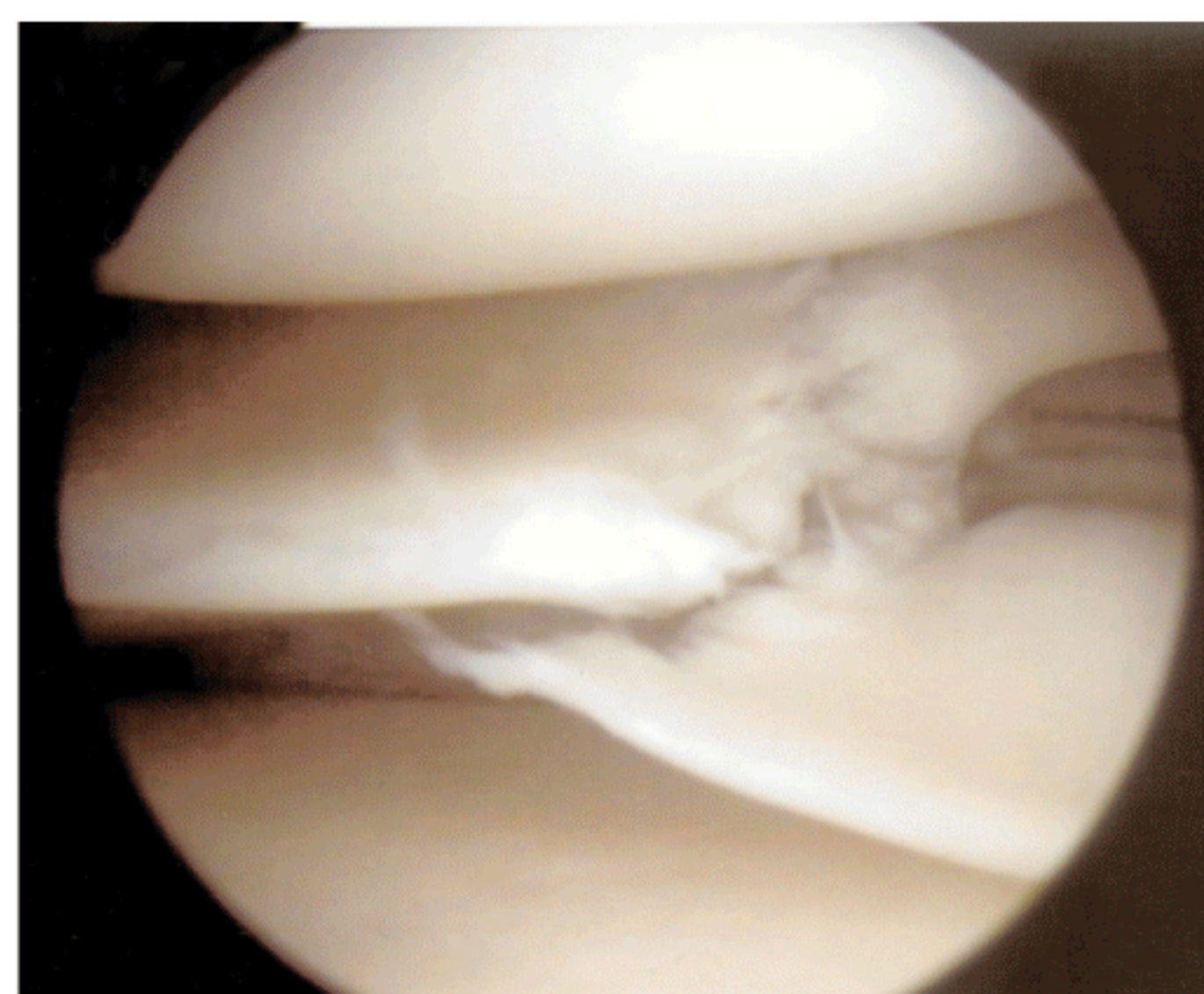
2. Peripheral rim failure model

Loss of integrity of the peripheral meniscal rim occurs most often in two regions:

A
 The area near the root, where the unloaded part of the posterior meniscal horn continues into the loaded part.

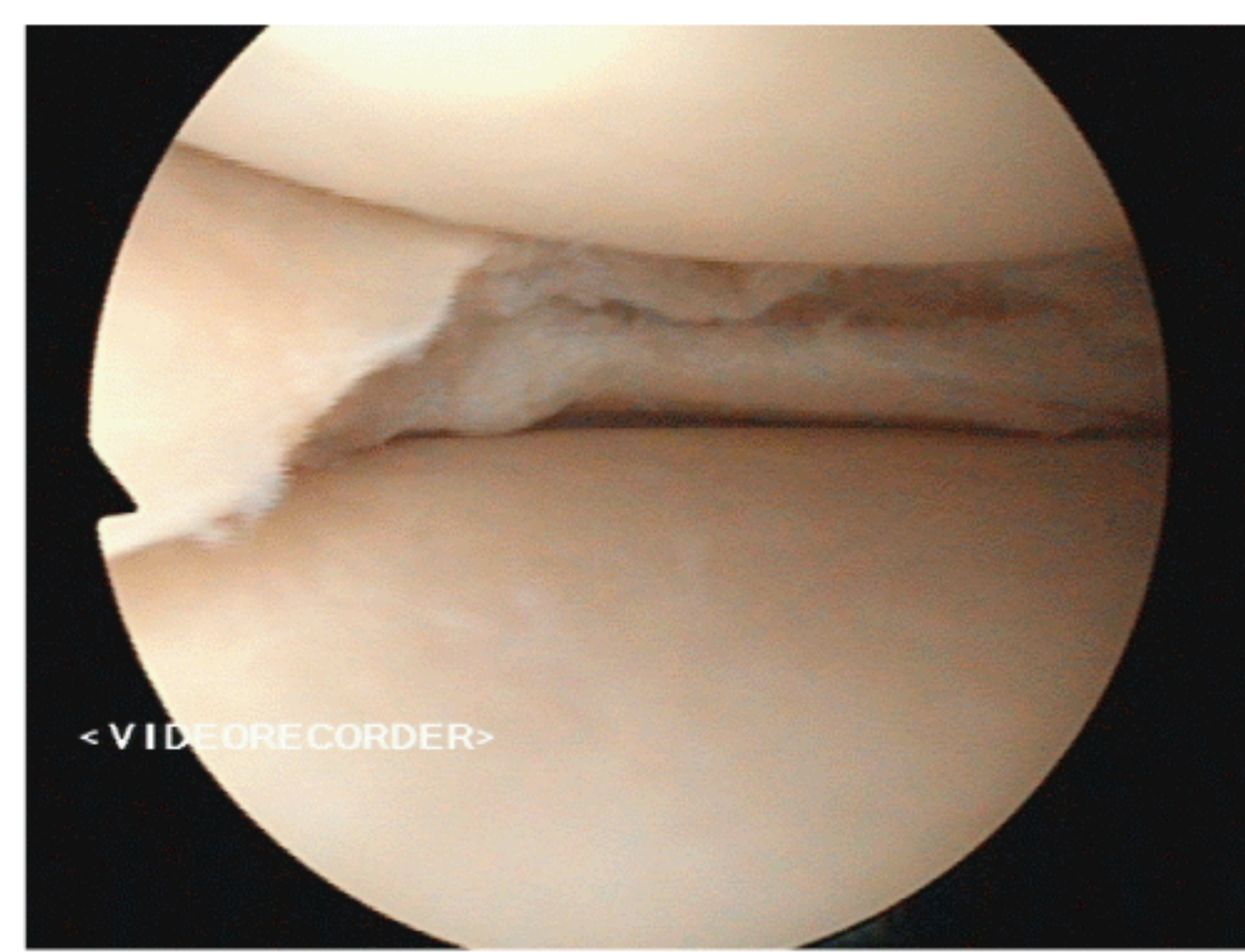


B
 The area at the posterior margin of the medial collateral ligament. There is a firm connection between the medial collateral ligament and the medial meniscus. Transverse tears are common in both of these areas.



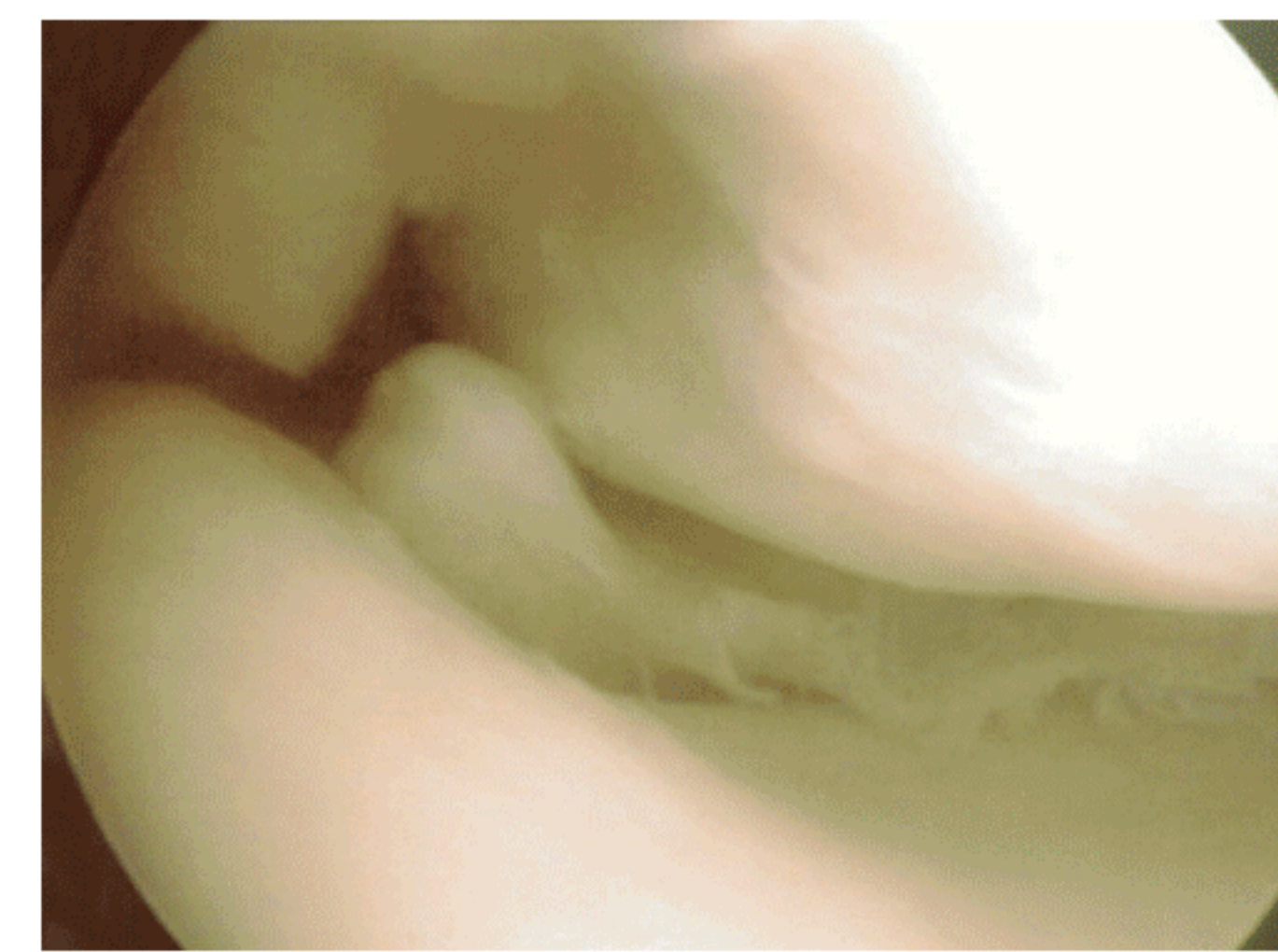
3. The horizontal tear model

Shearing forces during loaded flexion of the knee joint are the cause of horizontal tears. The tears start at the under surface of the meniscus and split the longitudinal fibrous rim in an upper and a lower bundle. This pattern can be observed in nearly every degenerative meniscal tear.



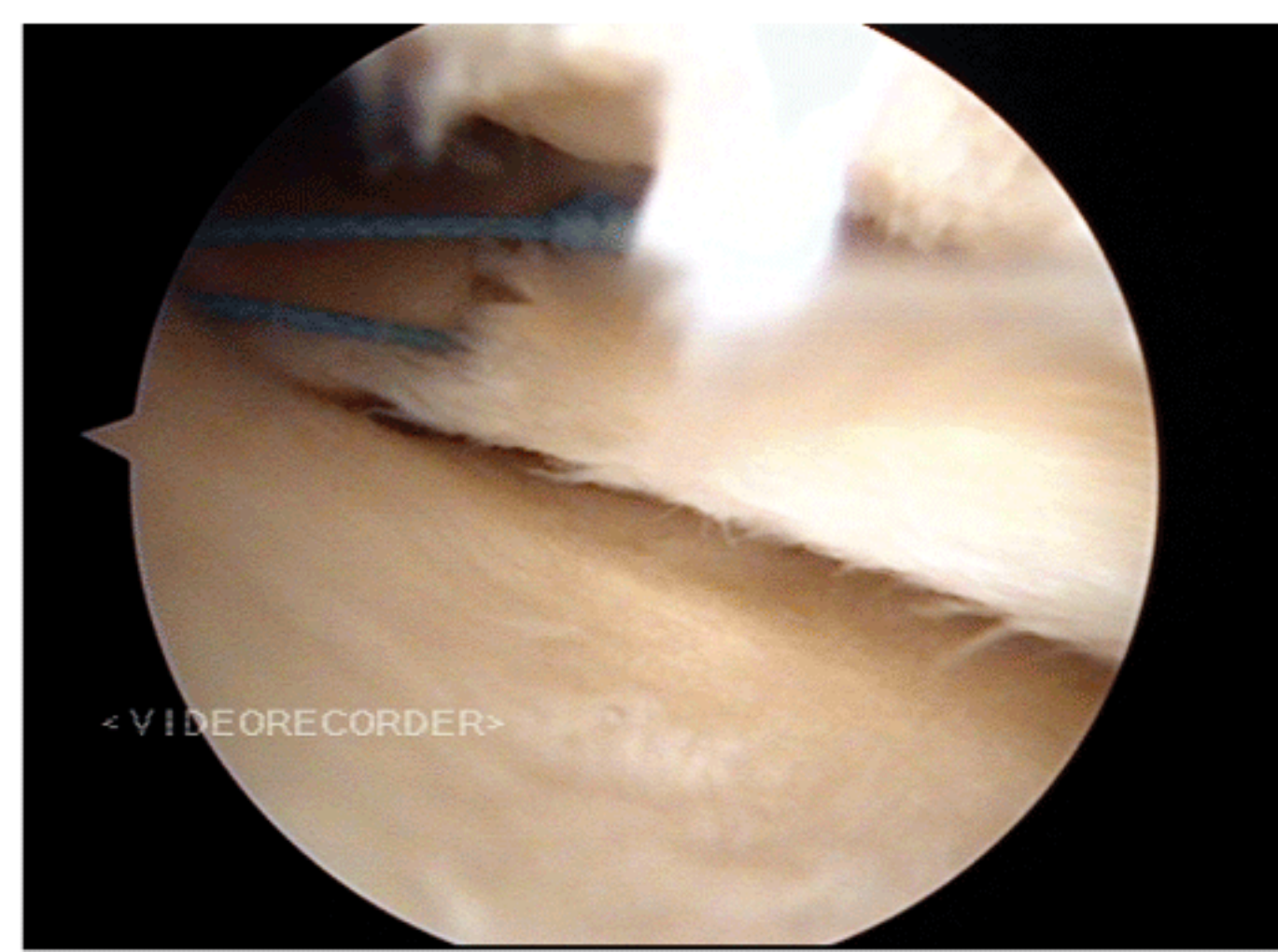
4. Plastic deformity model

Through degenerative changes, the meniscus softens and is mangled between the two condyles. The excess material forms pillow like structures at the peripheral site.



Discussion

These four models can be combined and produce a variety of complex tears. Peripheral rim reconstruction (PRR) and horizontal tear reconstruction (HTR) are new therapeutic principles giving hope to retain functional meniscal tissue in the joint and to slow down the process of degenerative arthritis.



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