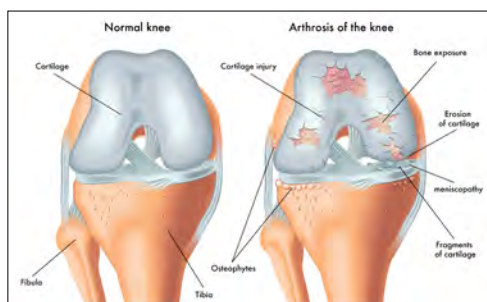


Did You Know?

Knee Osteoarthritis follow-up after Platelet-rich plasma (PRP) treatment with Olea Sphere®

Take-home message

- With aging population, the rise of obesity or growing interest in sport, the frequency of degenerative cartilage pathologies is increasing.
- Except for Osteochondritis, cartilage pathologies always begin with the superficial surface layer and then extend to the depths in the cartilage matrix.
- There are several cartilage gradation systems such as ICRS (International Cartilage Repair Society) or WOMS system in MRI (both available in Olea Sphere®). > **Picture 1**



- Knee Osteoarthritis (OA) is a chronic joint disease, characterized by progressive destruction of joint cartilage, leading to pain and loss of function.

This pathology affects more than 39 million people in Europe and this figure will probably double by 2020.

There are three stages of Osteoarthritis:

- early stage: joint cartilage degeneration occurs,
- intermediate stage: onset of the first radiological signs,
- advanced stage: full-thickness loss of cartilage and joint cartilage has disappeared.

Degenerative osteoarthritis is a chronic mechanical disease that differs from inflammatory osteoarthritis, which is an acute inflammatory disease.

Diagnosis and treatments are different.

Plate let-rich plasma (PRP) is a blood derivative product.

The PRP is collected from blood and isolated by centrifugation. There is no risk of "rejection" or allergy since blood is drawn from the patient (autologous). Patient's own platelet that has growth and healing factors are used.

Complications

- Pain
- Functional disability (extended work leave and decreased quality of life)
- Joint infection
- Osteonecrosis
- Cardiovascular risk

Therapeutic options

- Treatment of degenerative cartilage pathologies will be carried out by pain management and/or functional repercussions
- Rest
- Weight loss
- Physiotherapy
- Medical treatment
- Orthopedic biology, an emerging technique including injections of PRP to induce regeneration
- Surgery (arthroscopy, single or multi-compartment prosthesis)

In Olea Sphere®?

The interest of **knee cartilage T2 mapping** has been documented in various publications and this technique is a hot topic of clinical and research studies. The cartilage application in Olea Sphere® can be used for that purpose.

To assess the **response to PRP injection treatment**, regions of interest (ROI) can be selected on different areas of cartilage. > **Picture 2**

Then the **threshold filtering function** is used to select the suitable threshold values in ms (from 10 to 38 ms according to publications **Ref[1], [2], [3]**); resulting cartilage volume can be then evaluated. > **Picture 3/A**

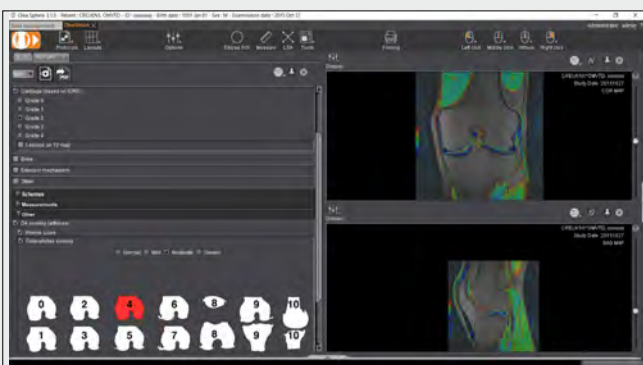
Comparing the current results with those prior to PRP injection make it easier to follow-up T2 values

progression and the resulting cartilage volume. > **Picture 3/B**

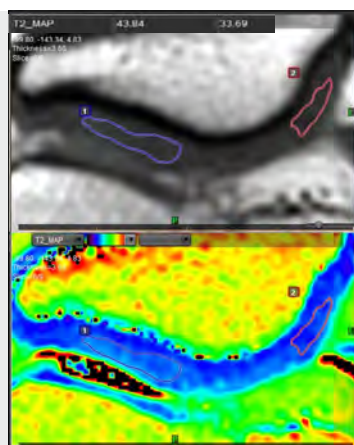


Texture is an emerging graphic representation criterion in medical imaging, particularly for cartilage. Thus, the distribution of T2 values within an MRI slice can be quantified by the gray-level co-occurrence matrix.

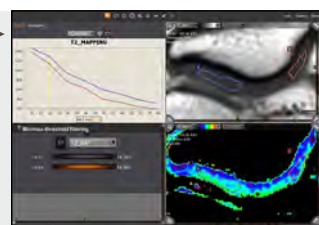
Picture 1



Picture 2



Picture 3/A



Picture 3/B



Sources: **Ref [1]** Ebert JR, Robertson WB, Woodhouse I, Fallon M, Zheng MH, Ackland T, et al. Clinical and magnetic resonance imaging-based outcomes to 5 years after matrix-induced autologous chondrocyte implantation to address articular cartilage defects in the knee. *Am J Sports Med* 2013;39:753-63. **Ref [2]** Tattini S, Mamisch TC, Welsch GH, Glaser C, Szomolanyi P, Gebetsroither S, et al. Quantitative T2 mapping of matrix-associated autologous chondrocyte transplantation at 3 Tesla: an in vivo cross-sectional study. *Invest Radiol* 2007;42:442-8. **Ref [3]** Eagle S, Potter HG, Koff MF. Morphologic and quantitative magnetic resonance imaging of knee articular cartilage for the assessment of post-traumatic osteoarthritis. *J Orthop Res* 2016;34:100-10. **Ref [4]** Gold GE, Eckstein F, et al. Articular cartilage in the knee: current MRI imaging techniques and applications in clinical practice and research. *Radiographics* 2011;31:374-8. **Ref [5]** <https://www.abovepain.com/cartilage/knee-osteoarthritis.html> **Ref [6]** http://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [7]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [8]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [9]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [10]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [11]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [12]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [13]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [14]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [15]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [16]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [17]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [18]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [19]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [20]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [21]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [22]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [23]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [24]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [25]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [26]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [27]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [28]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [29]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [30]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [31]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [32]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [33]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [34]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [35]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [36]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [37]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [38]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [39]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [40]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [41]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [42]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [43]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [44]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [45]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [46]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [47]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [48]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [49]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [50]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [51]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [52]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [53]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [54]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [55]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [56]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [57]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [58]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [59]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [60]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [61]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [62]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [63]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [64]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [65]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [66]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [67]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [68]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [69]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [70]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [71]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [72]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [73]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [74]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [75]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [76]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [77]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [78]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [79]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [80]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [81]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [82]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [83]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [84]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [85]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [86]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [87]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [88]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [89]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [90]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [91]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [92]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [93]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [94]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [95]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [96]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [97]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [98]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [99]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [100]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [101]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [102]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [103]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [104]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [105]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [106]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [107]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [108]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [109]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [110]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [111]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [112]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [113]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [114]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [115]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [116]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [117]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [118]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [119]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [120]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [121]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [122]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [123]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [124]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [125]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [126]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [127]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [128]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [129]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [130]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [131]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [132]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [133]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [134]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [135]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [136]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [137]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [138]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [139]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [140]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [141]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [142]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [143]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [144]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [145]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [146]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [147]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [148]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [149]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [150]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [151]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [152]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [153]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [154]** https://www.gprarthrosc333.fr/Png_of_Arthrosc333.htm **Ref [155]**