

TROCHLEA DYSPLASIA AS THE MAJOR ANATOMIC RISK FACTORS FOR PATELLOFEMORAL JOINT INSTABILITY: AN INFOGRAPHIC AS A VISUAL LEARNING TOOL

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ABSTRACT

Patellofemoral instability (PFI) is a common condition in children and adolescents, ranging from mild discomfort and mal-tracking to lateral patellar dislocation [1]. A number of anatomical risk factors have been described in the literature, such as trochlear dysplasia, patella alta, excessive tibial tuberosity to trochlear groove (TT-TG) distance, patellar tilt and soft tissue alterations [2]. Among them, TD has been identified as the main anatomical risk factor with the strongest association with PFI [1, 2]. In the study by Dejour et al. [2] radiographically observed TD was identified in 96% of patients with a history of patellofemoral dislocation [1, 2]. Patients with Dejour Type D dysplasia are characterized by a prominent and convex lateral facet with a vertical connection to a hypoplastic medial facet (Figure 1), which provides inadequate tracking of the patella in the trochlea during flexion leading to patella subluxation [2]. Non-operative treatment of lateral patellar dislocation presents a rate of re-dislocation up to 70% within 24 months of the first episode [3]. Sulcus deepening trochleoplasty is indicated for Type B and D dysplasia, in order to improve patella tracking, reduce the rate of re-dislocation and achieve good functional outcomes [2, 4].

Trochlea dysplasia is defined as a shallow or flattened groove with decreased resistance to lateral patellar translation. TD can be assessed on computed tomography (CT) and magnetic resonance imaging (MRI) with the use of overlapping axial images and are able to show perfectly the global shape of the femoral trochlea [2]. The thresholds for identifying trochlear dysplasia are established based on the sulcus angle $\geq 145^\circ$, medial/lateral trochlea facet asymmetry $< 40\%$, trochlear depth < 3 mm and lateral trochlear inclination $\leq 11^\circ$ and therefore it can be used in young adolescents [4, 5]. A deep knowledge of anatomic variations and abnormalities of the patellofemoral joint, which may predispose to PFI, is crucial in order to choose the appropriate treatment for each patient.

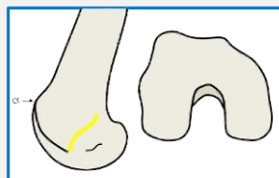
Keywords: trochlea dysplasia, risk factors, patellofemoral joint, instability

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Trochlea Dysplasia as the Major Anatomic Risk Factor for Patellofemoral Joint Instability

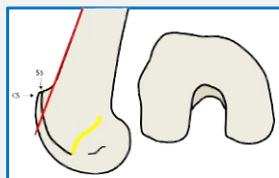
DEJOUR CLASSIFICATION

Type A – 54%



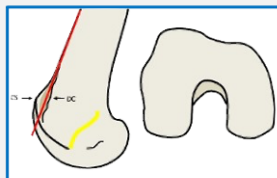
CS
+ shallow trochlea

Type B – 17%



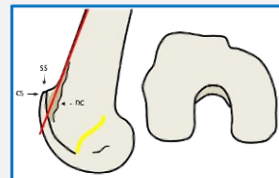
CS, SS
+ flat or convex trochlea

Type C – 9%



CS, DC
+ asymmetry of TF
+ medial facet hypoplastic

Type D – 11%



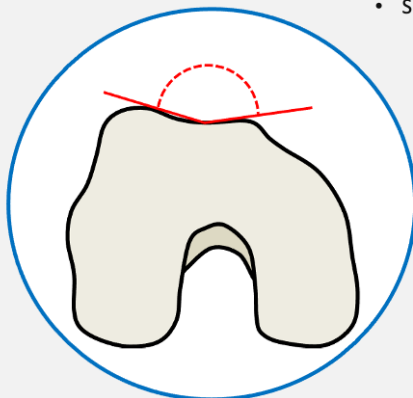
CS, SS, DC
+ asymmetry of TF
+ link between facets

Abbreviations: CS, Crossing sign; SS, supratrochlear spur; DC, double contour, TF, trochlear facets

IDENTIFICATION OF DYSPLASIA

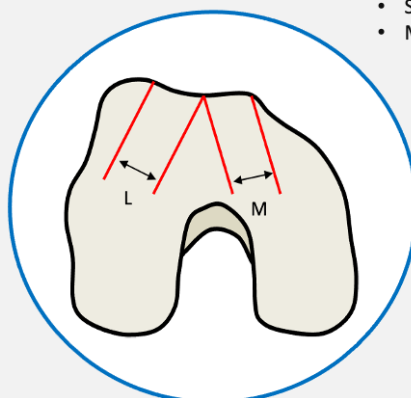
SULCUS ANGLE

- Mean angle: $\geq 145^\circ$
- Sensitivity: 75%
- Specificity: 88%



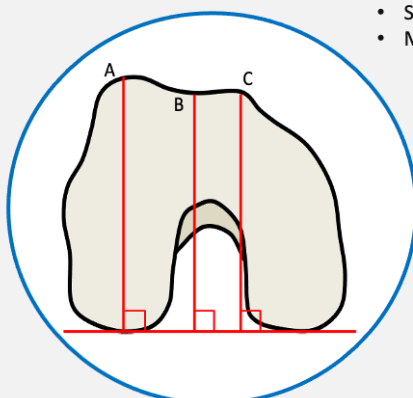
TROCHLEA FACET ASYMMETRY

- Mean ratio: $< 40\%$
- Sensitivity: 100%
- Specificity: 96%
- Measured-Calculated:
 $M/L \times 100\%$



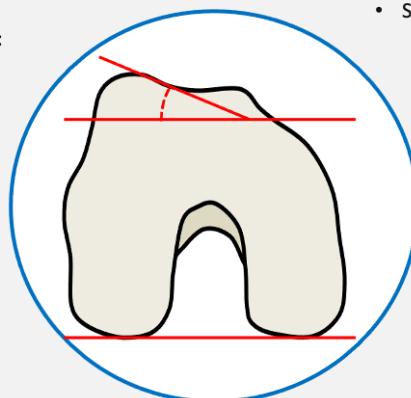
TROCHLEA DEPTH

- Mean depth: $< 3 \text{ mm}$
- Sensitivity: 100%
- Specificity: 96%
- Measured-Calculated:
 $(A + C/2) - B$



LATERAL TROCHLEA INCLINATION

- Mean inclination: $\leq 11^\circ$
- Sensitivity: 93%
- Specificity: 87%



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