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# The severity of trochlea dysplasia can be determined by the height of the Pathological Double Contour(hPDC)

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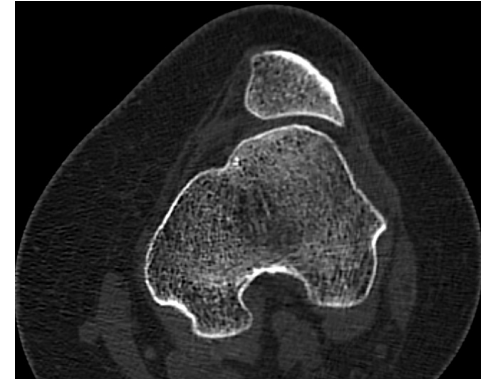
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- **Informed consent:** Not required
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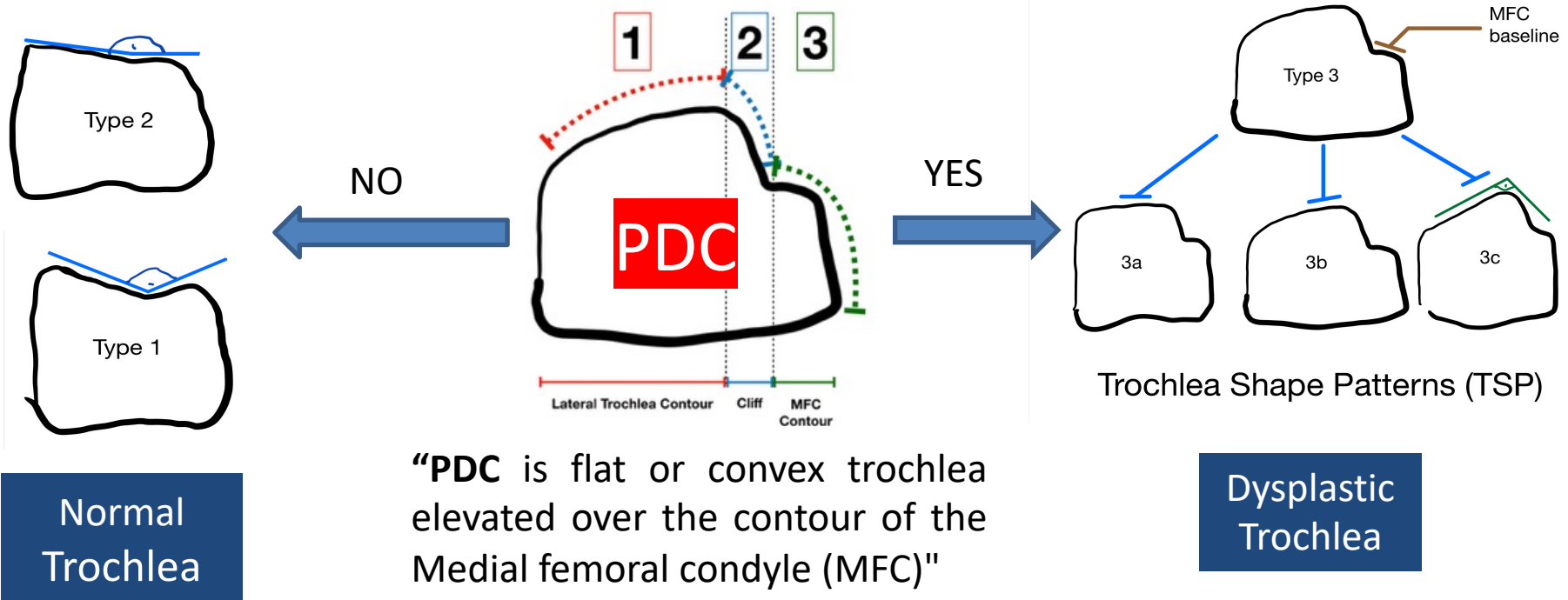
# Introduction

- Trochlea dysplasia (TD) is a complex 3-Dimensional deformity with different degrees of severity.
- Multiple qualitative and quantitative variables have been described to define trochlea dysplasia.
- Current classifications (Dejour and Bristol-Oswestry) are based on qualitative variables:
  - Decision to treat relies on the subjective interpretation by the surgeon of the severity of dysplasia.
  - Poor inter-observer reliability. Difficult to communicate between experts and challenges for research.



# Introduction

- We define trochlea dysplasia as the presence of the Pathologic Double Contour (PDC).



# Pathologic Double Contour (PDC)

- Radiology sign seen on axial MRI scans
- PDC: flat or convex trochlea elevated over the MFC
- Formed by two distinct contours separated by a cliff
- The baseline is the contour of MFC



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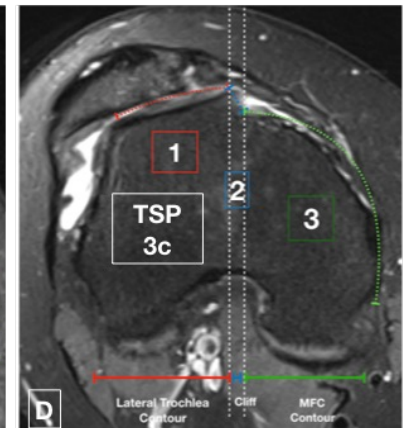
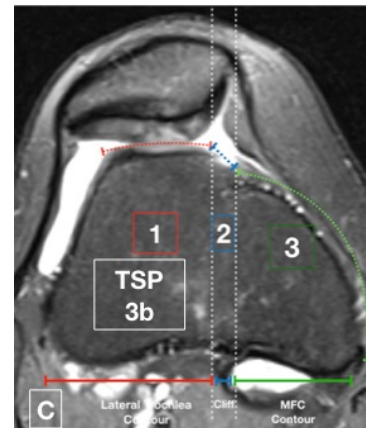
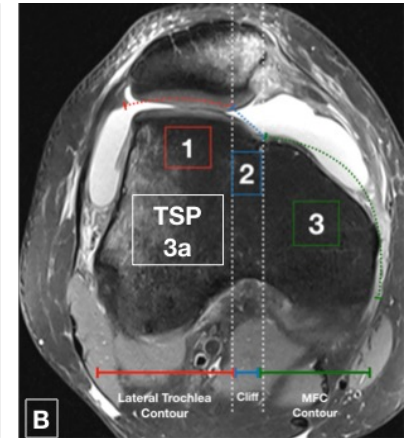
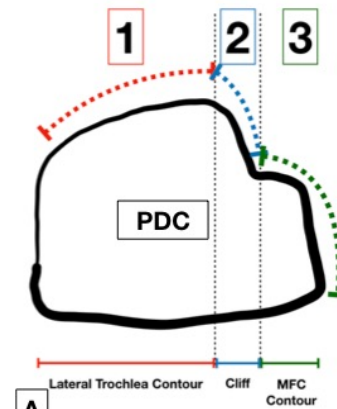
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Original Research

The pathologic double contour sign and the trochlea shape patterns can diagnose trochlea dysplasia

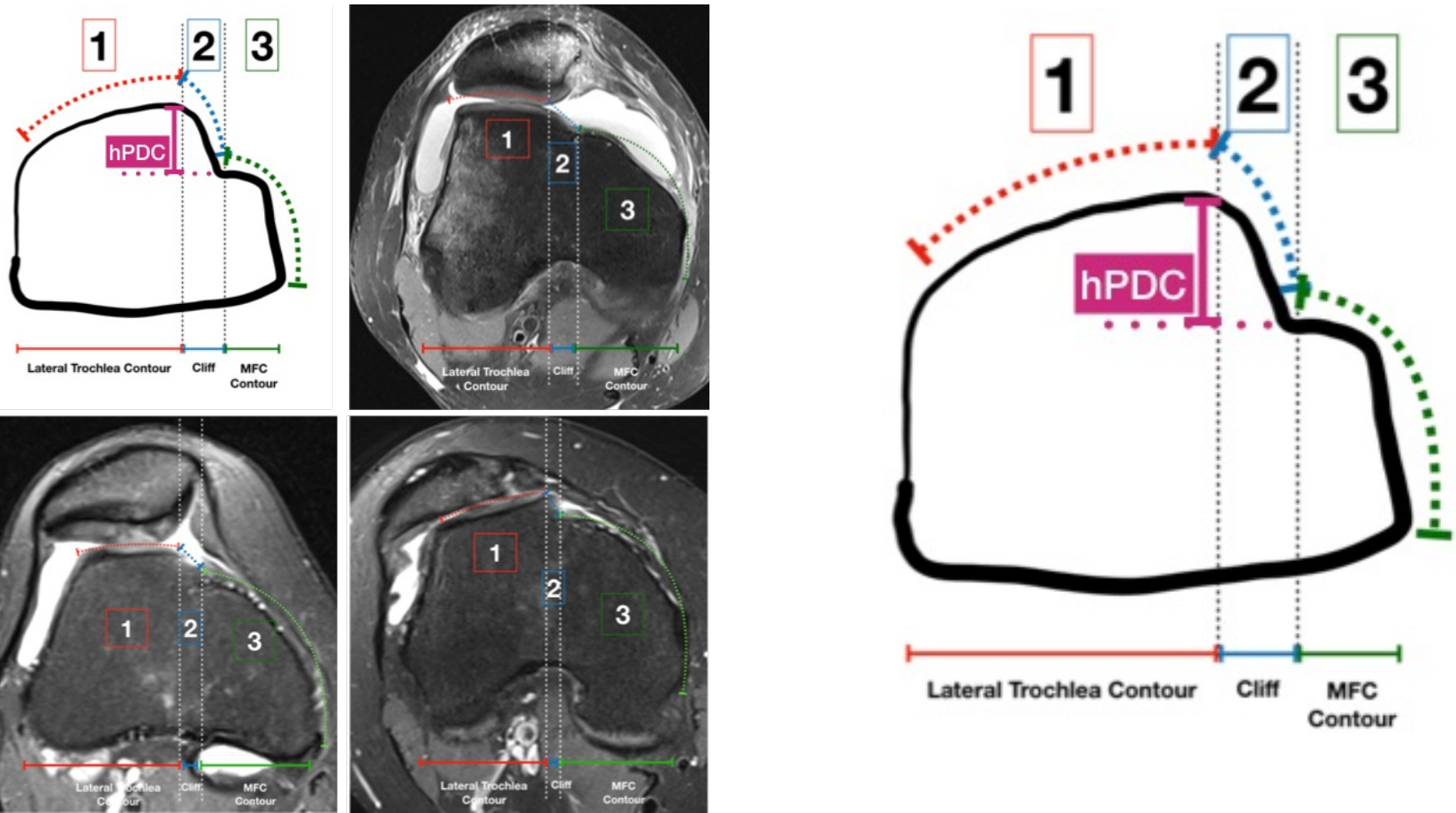
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- 1 Lateral trochlea contour
- 2 Cliff
- 3 Medial Femoral Condyle (MFC) contour (baseline).

# Objectives

- The goal of this study is to determine if the severity of TD can be determined by the height of PDC(hPDC).

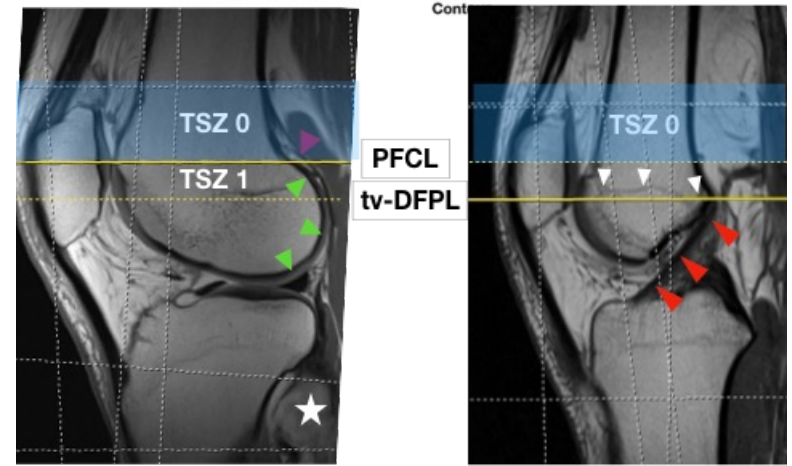
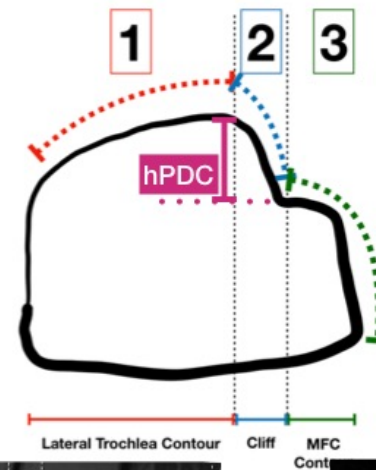




# Material and Methods

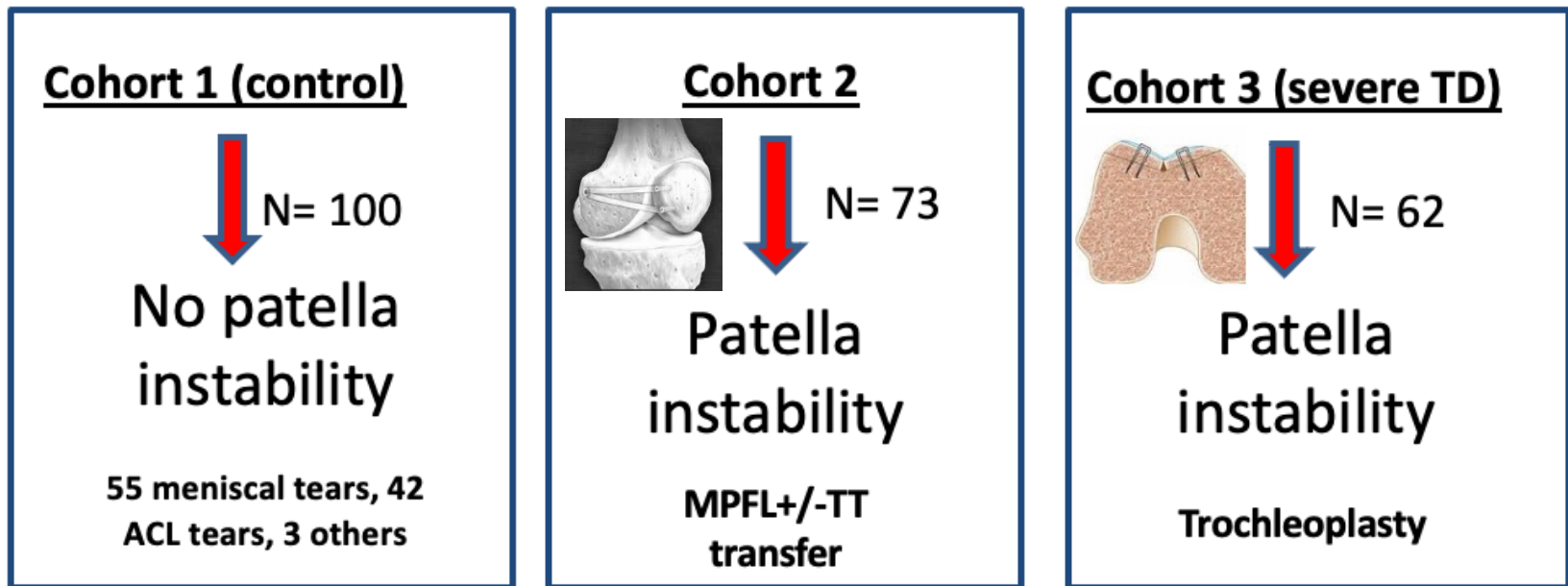
- The presence of the Pathologic Double Contour (PDC) was identified in the **axial view** MRI at specific anatomic references (tv-DFP, PFCL and TSZ0).
- Height of pathologic double contour (*hPDC*) was measured at its highest point.
- The *hPDC ratio* was calculated to account for different patient sizes:

$$hPDCr = hPDC / \text{width of femur} * 100$$



# Material and Methods

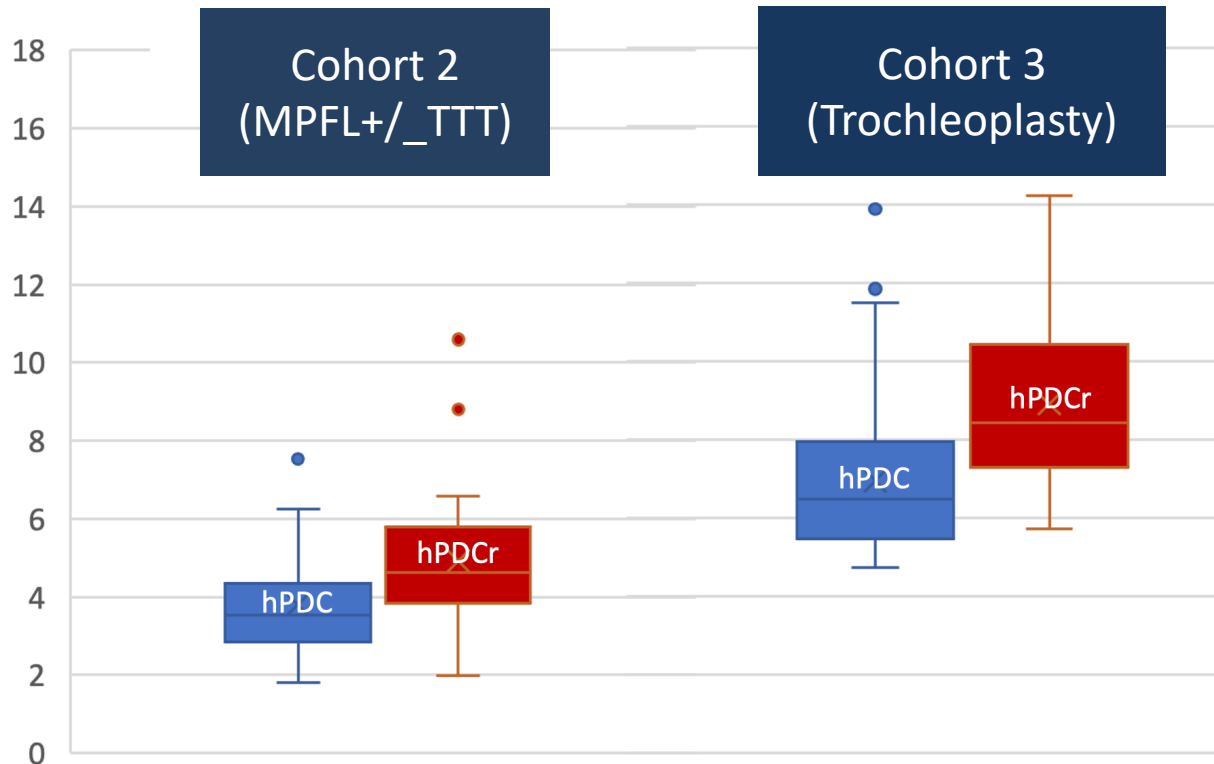
- 235 patients



- The Independent Samples t Test (t student) was used to compare means of the hPDC and hPDCr between Cohort 2 and 3.
- A ROC curve analysis was performed using the hPDC and hPDCr value to determine when a trochleoplasty was required.

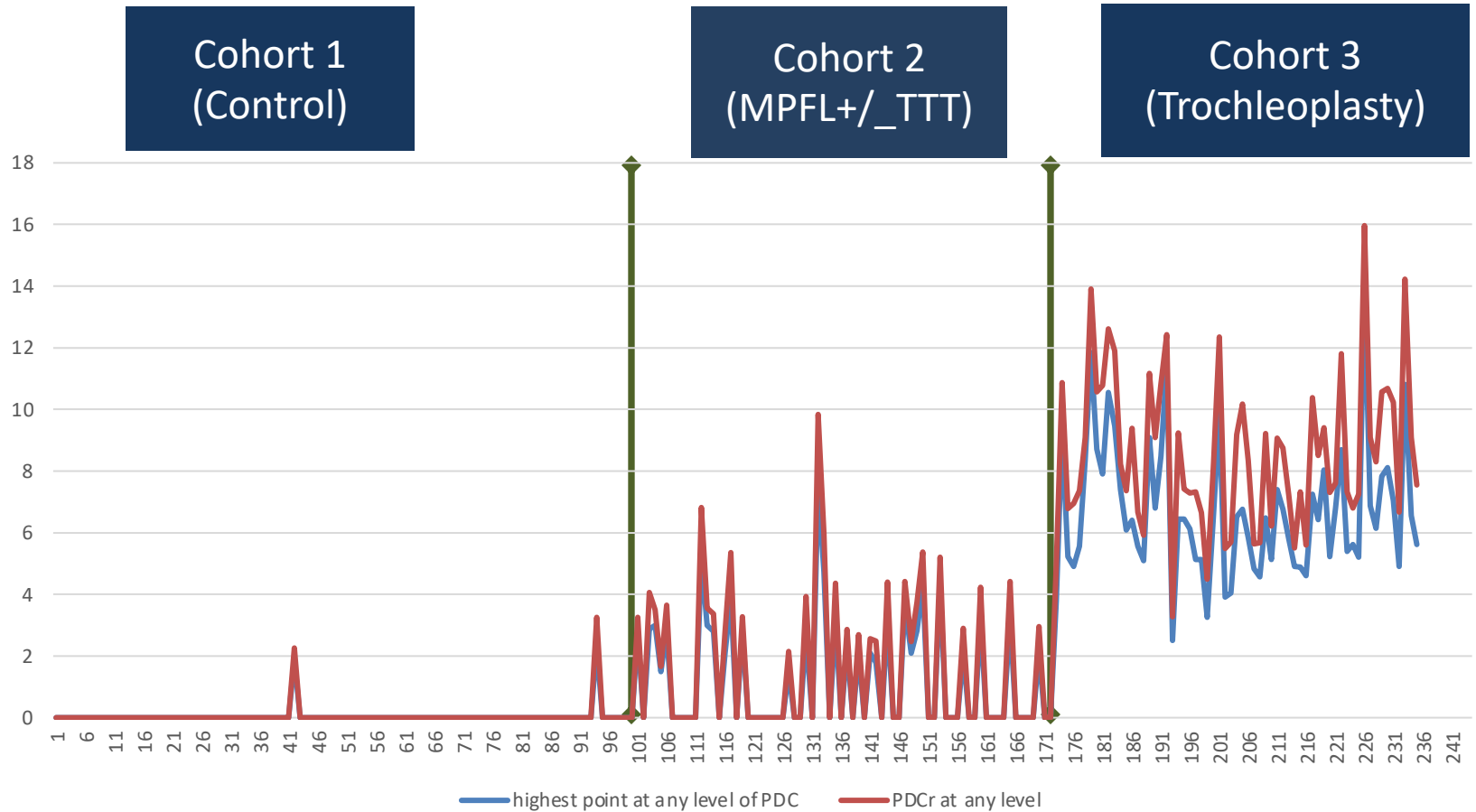


# Results



- There was statistically significant difference in the height of the PDC of the cohort 2 (mean hPDC= 2.98+/-1.32) compared to the cohort 3 (mean hPDC=6.75+/-2.14)  $t(92)=-9.073$ ,  $p<.001$ ).
- There was statistically significant difference in the PDC height ratio of the cohort 2 (mean hPDCr= 3.85+/-1.972) compared to the cohort 3 (mean hPDCr=8.64+/-2.48)  $t(92)=-9.746$ ,  $p<.001$ ).

# Distribution of hPDC and hPDCr in different cohorts



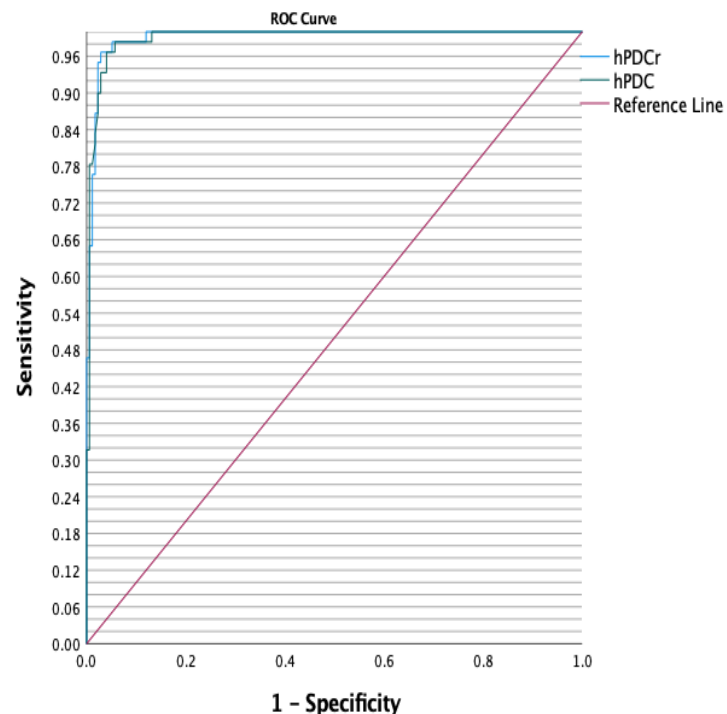
# ROC analysis hPDC and hPDCr

## hPDC

- A hPDC of 3.22mm (or hPDCr of 4.45) included 98.4% of cases who eventually required trochleoplasty (sensitivity).
- In clinical practice a hPDC >3.22mm can be used as a screening test to detect moderate to severe trochlea dysplasia that would potentially require trochleoplasty.

## hPDCr

- A hPDCr of 5.43 gave a specificity of 98.3%. In clinical terms it means that only 1.7% of patients with less than this value were listed for a trochleoplasty.
- In clinical practice a hPDCr >5.43 can be used as an absolute indication for trochleoplasty.

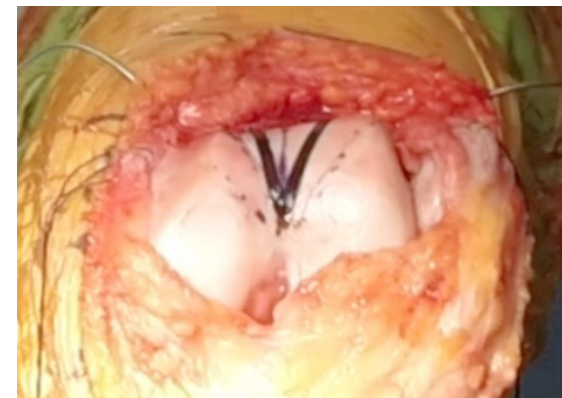
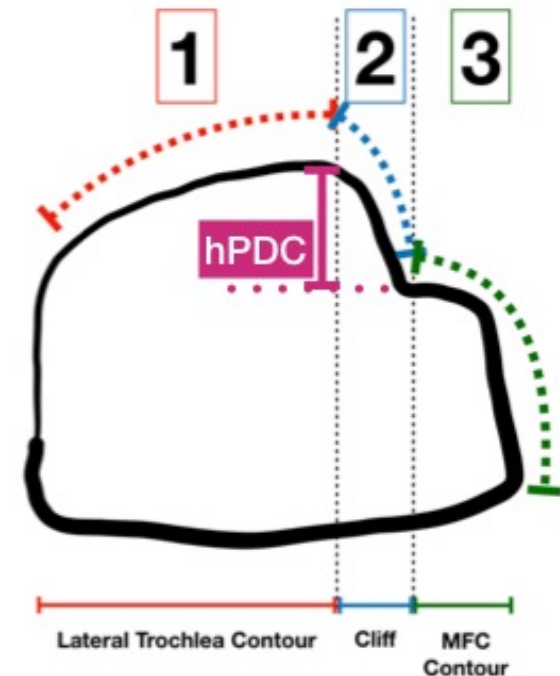


	Cut off value	Sensitivity	Specificity
hPDCr	4.45	98.40%	96.0%
	5.43	96.80%	98.3%
hPDC	3.22	98.40%	95.4%
	3.90	96.8%	97.1%

Cut-off values of hPDC and hPDCr for determining the need for trochleoplasty.

# Conclusions

- The height of the Pathologic Double Contour can determine the severity of trochlear dysplasia:
  - The greater the value of the height of the PDC (hPDCr), the more severe the dysplasia is.
  - This OBJECTIVE/quantitative measurement will help communication amongst experts and allow future research in trochleoplasty
- A hPDC >3.22mm can be used as a **screening** test to detect moderate to severe trochlea dysplasia and refer patients for consideration of trochleoplasty.
- A hPDCr >5.4 indicates **severe** trochlea dysplasia and is an indication of trochleoplasty.
- A hPDCr between 4.45 and 5.4 is considered **moderate** dysplasia. Strong consideration for trochleoplasty.



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