A new comprehensive and straightforward radiological classification for FAI

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Introduction

• Current classification and quantification of FAI based on femoral sphericity and acetabular coverage

• New parameters requires dedicated software and do not provide a descriptive terminology for the severity of the deformities

• Classifications provide a concise and descriptive terminology, information regarding the severity of the injury, and guidance as to the choice of treatment

• A classification method for CAM and pincer deformities is necessary to graduate the pathology and give the patients the indications for the correct surgery
Methods

• Three views pelvic and hip study: anteroposterior view, Dunn view and Lequesne false profile view
• We classify three stages of severity, respectively for the CAM and the pincer deformity, according to specific patterns
CAM

- Based on the anteroposterior and the Dunn view
- Three parallel lines from medial to lateral perpendicular to the neck axis
- First line is drawn passing through the center of the femoral head
- Second line is drawn through the femoral neck isthmus
- Third line is drawn at the midpoint between the first two
CAM

• CAM 1: deformity between the first line and the middle line
• CAM 2: deformity between the middle line and the isthmus line
• CAM 3: deformity beyond the isthmus line

• We define as CAM 1 all the deformities that are seen only on the Dunn view, despite their extension
Pincer

• Based on the lateral center edge angle of Wiberg (LCEA) modified by Ogata and the anterior center edge angle of Lequesne (ACE) measured on the anteroposterior and false profile view

• The modified LCEA is measured from the center of the femoral head to the lateral sourcil, a landmark medial to the far lateral projection of the acetabular rim, or dense subchondral bone forming the dome of the acetabulum

• We identify the LCEA and the ACE and we draw two other angle measuring half the first, thus identifying three zones
Pincer

- Pincer 1: deformity included in the first half LCE angle
- Pincer 2: deformity included in the second half LCE angle
- Pincer 3: deformity extending the second half LCE angle

- We have defined as Pincer 1 all the cases with a positive crossover sign
Methods

• 30 hips with symptomatic FAI undergoing hip preservation surgery
• 30 asymptomatic hips
• Four observers
• Initial evaluation for interobserver reliability
• Repeated analysis at least at 2 weeks for intraobserver reliability
• Average pairwise Cohen’s Kappa test and Fleiss’ Kappa coefficient to determine both interobserver and intraobserver reliability
Results

• CAM:
  • Interobserver:
    • average pairwise Cohen’s Kappa 0.846
    • Fleiss Kappa 0.846
    • average pairwise percent agreement 89.4%
  • Intraobserver:
    • average percent agreement 84.5%

• Pincer:
  • Interobserver:
    • average pairwise Cohen’s Kappa 0.922
  • Intraobserver:
    • average percent agreement 87%
Conclusion

- Critical point in classifying CAM = identification of the isthmus
- Difficulties with short necks and pistol grip deformities
- Difficulties in classifying pincer with mild dysplasia and positive crossover sign
- Excellent levels of interobserver and intraobserver reliability for CAM and pincer
- Usefull tool in assessing hip and pelvic morphology
- Usefull in planning surgery
- Further studies are needed to correlate the classification to specific intraoperative findings
References