Femoroacetabular impingement
in adolescents and young adults – an update

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Key Notes

- Anatomical and pathological mechanisms
- Radiological assessment
- Aetiology
- Epidemiology
- Management
Femoroacetabular Impingement (FAI)

- Abnormal relationship: proximal femur - acetabulum
- Hip pain and early degenerative change

• Challenging diagnosis

• Clinical and radiological criteria

• Long-standing hip pain

• Reduced hip motion
  – Internal rotation and flexion

• Positive test for anterior impingement
Anatomy - Radiology - Aetiology - Epidemiology - Management

- **A: Normal**

- **B: Cam-type**

- **C: Pincer-type**

• Standardised AP view, preferably weight-bearing
  – Tilt and Rotation

• Lateral view

• CT scan, MRI, MRI arthrography
Cam-type

A
Pistol-grip Deformity

B
Focal prominence

C
Flattened lateral head

Alpha angle

Cam-type

Lateral frog-leg view

Antero-posterior (AP) view
Pincer-type

A  Posterior wall sign (PWS)  
B  Cross-over sign (COS)  
C  Excessive acetabular coverage

• ‘Idiopathic’

• Slipped capital femoral epiphysis (SCFE)

• Perthes’ disease (CLP)

• Other

• Other risk factors:
  – Increased BMI
  – Age
  – Race
  – Genetics
  – Heavy workload
  – Certain sport activities during growth

Murray. The aetiology of primary osteoarthritis of the hip. *Br J Radiol* 1965
• Cam development in high-level athletes during skeletal maturation – Increased stress on femoral physis?

• Ice-hockey, basketball, possibly soccer

• Cam deformity recognisable and present from age 13 years

• Gradual development of cam lesion during skeletal maturation

Male ice-hockey player, 21 yrs old

Courtesy of Dr. Erik Vang, Head Senior Consultant, Musculoskeletal radiologist, Betanien Hospital, Bergen, Norway
SCFE, female, 40 yrs

Perthes, boy 12 yrs
• Age - Gender - Race

• Radiological and Clinical assessment

• Definition of disease

• Clinical symptoms in up to 15% of healthy adult population

• Positive impingement test in population-based study of 19 year-olds: 7.3% of males, 4.7% females

Leunig, Ganz. [Femoroacetabular impingement. A common cause of hip complaints leading to arthrosis]. Unfallchirurg 2005

Norway:
-Cam-type: 35% of Males, 10% of Females (AP and frog-leg, 874 M, 1207 F, 19 yrs)
-Alpha angle: Higher cut-off values, Gender-specific values

Denmark:
Cam-type: 17% of Males, 4% of Females (only AP view, 1184 M, 2018 F, 22-93 yrs)

USA:
Cam-type: 24% Boys, 10% Girls (Pelvic CT, 276 M, 282 F, 10-18 (average 14) yrs)

• Non-operative management

• Surgery - Ongoing debate

• Arthroscopic surgery vs. Open surgery with femoral head dislocation, or a combination of the two surgical methods

• Arthroscopic surgery prefered treatment in pediatric population

Clohisy, St John, Schutz. Surgical treatment of femoroacetabular impingement: a systematic review of the literature. *Clin Orth Relat Res* 2010
Future perspectives

• High-level sports activity during growth may be a new and distinct risk factor for a cam-type deformity. Further research needed.

• Radiographic markers and values associated with FAI are not established in the paediatric population

• Composite scoring system: Clinical and radiological markers

• Further studies in the paediatric population are required

• Genetic aspects