

Protocol for measurement of migration percentage (MP) with Orthoview

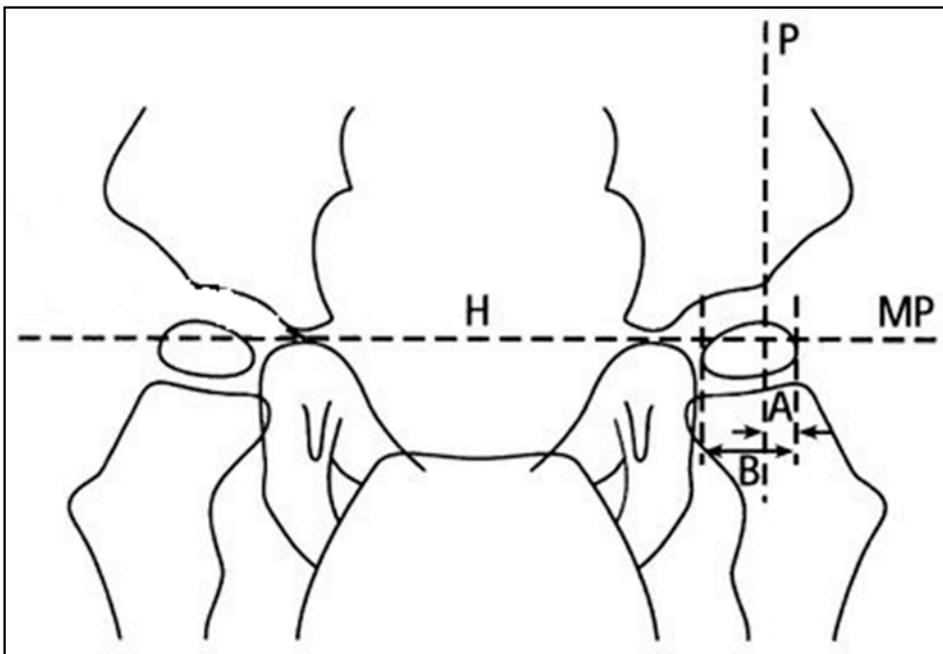
Reimers (1980) describes MP as "MP signifies the fraction (expressed as a percentage) of the **visible part of the femoral head** which on an AP radiograph has migrated beyond Perkin's line/acetabular ridge. Measurements are made along a line horizontal to the pelvis".

Migration percentage (MP) measurement is the result of the following calculation

1. Draw Hilgenreiner's line (H) - a horizontal reference line, which is drawn between the Y cartilages connecting the innermost part of the iliac bones.
2. Draw Perkin's line (P) – a vertical reference line, perpendicular line from H-line, from the lateral border of the acetabulum.
3. Draw perpendicular lines from H-line either side of the femoral head.

These lines are illustrated in the diagram below and form the basis for calculating the migration percentage of the femoral head. The migration percentage is the distance between the lateral border of the femoral head and Perkin's line (A) divided by the distance between the medial and lateral borders of the femoral head (B) as illustrated.

$$MP = A/B \times 100\%$$



Measuring MP with OrthoView

OrthoView software package may not come as standard on all Carestream accounts. It is displayed as a Doctor's bag icon on the top right of the screen.

To upload images to OrthoView:

- Open image as normal on Carestream
- Select File, Click 'Save as' and look for OrthoView folder on C: drive.
 - Save image under **File Name** - C:\Orthoview\ child's initials, etc.
 - Select **Save as Type** - DICOMDIR
 - Selection – highlight 'current selection'
 - Size – original resolution
 - Click 'Save'
 - This will take you back to PACS screen, click green tick to indicate done
 - Load next image for PACS and repeat above steps
- You can load several images at one time

To open all loaded in OrthoView:

- Open OrthoView and images will automatically upload
- If OrthoView is already open, click 'refresh' or 'import Dicom image and images will upload.

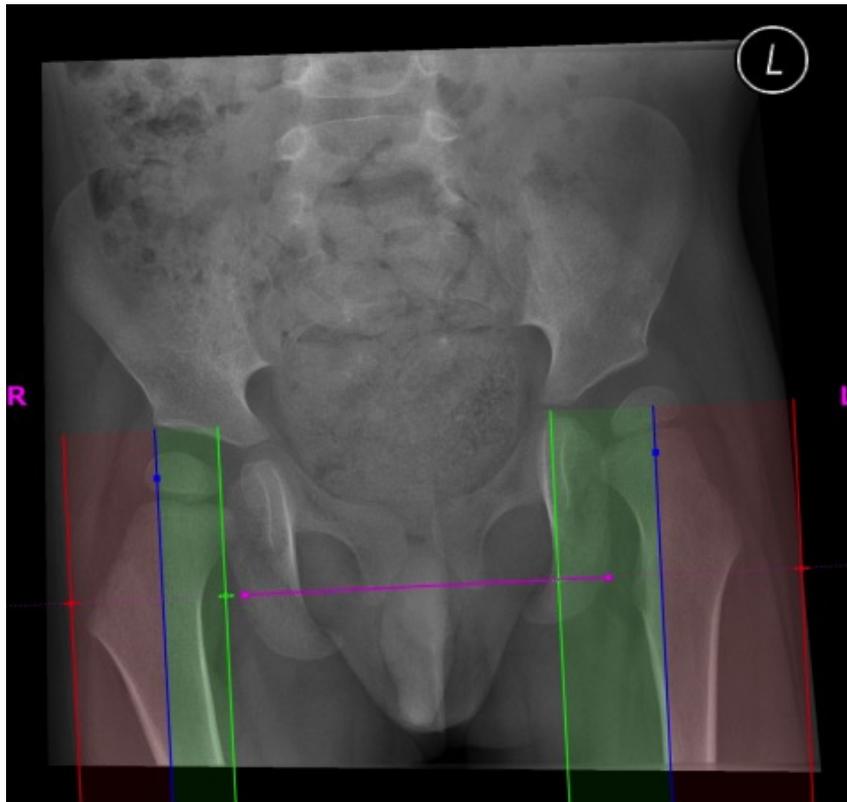
To Measure images:

1. Select procedure - Choose child icon, choose pelvis (line between hips), click open selected XR
2. On next screen choose AP for Template, X-ray laterality as bilateral, oversize at 100% and click to confirm
3. Planning – click Reimers Migration Wizard
 - a. This will bring up Hilgenreiners (in pink) and Perkin's (in blue) lines – position these first.
 - i. Hilgenreiner's - horizontal reference line, which is drawn between the Y cartilages connecting the innermost part of the iliac bones

- ii. Perkin's – perpendicular to Hilgenreiner's line from lateral border of the acetabulum
- b. Move coloured sections to indicate position of femoral head relative to Perkin's line– green is medial, red is lateral **NB – it may be useful to use the magnification icon to more accurately place the reference lines.**

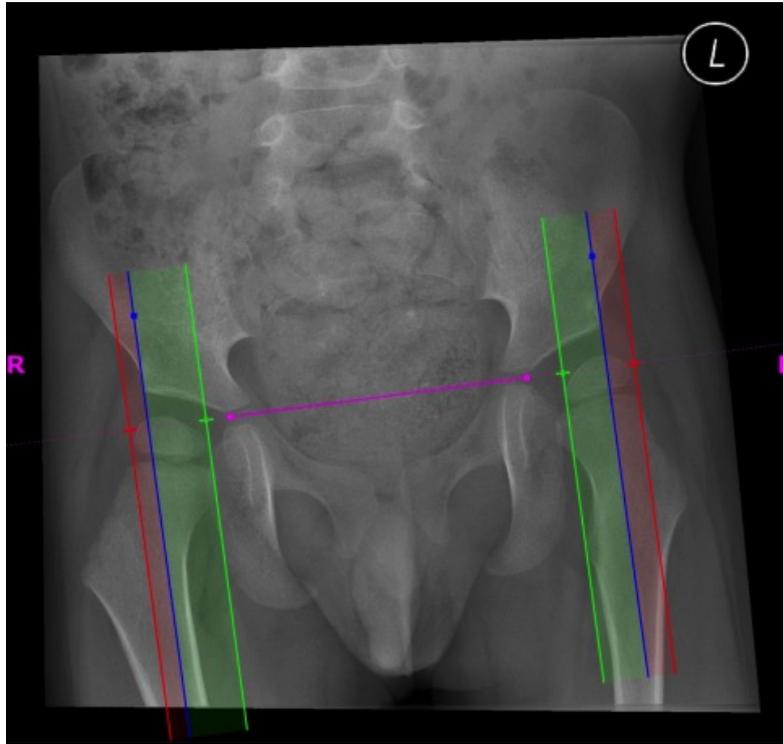
Example A – Reimer's Migration Percentage

This measures the percentage of the femoral head lying beyond the lateral border of the acetabulum.



- i. Position green line at most medial aspect of femoral epiphysis
- ii. Position Lateral red line at most lateral aspect of femoral epiphysis
- iii. Measure (R) hip and then repeat for (L) hip.

Reimer's Migration Percentage – ® 25%, (L) 38%



iv. Migration percentage/index will be displayed in *Planning Results* – record these on attached form.

4. To move to next image, select 'discard'. You will be asked if you wish to '*permanently destroy all record of this templating session*'. Click 'yes' if you wish to move to next image. (NB this will delete image out of OrthoView)

References:

AusACPDM 2011. Hip Surveillance - Australasia Academy of Cerebral Palsy and Developmental Medicine, <http://www.ausacpdm.org.au/professionals/hip-surveillance> (accessed 07.11.2011). *Image reproduced with permission – Jan 2013, e-mail correspondence with K Graham.*

Eklof, O., Ringertz, H., Samuelsson, L., 1988. The percentage of migration as an indicator of femoral head position. *Acta Radiologica*, 29, pp. 363–366.

Reimers, J., 1980. The stability of the hip in children a radiological study of results of muscle surgery in cerebral palsy. *Acta Orthopaedica Scandinavica*, Suppl. 184. pp. 1-100.