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THE CE ANGLE OF NORMAL HIPS

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The Center-Edge angle (CE angle) of Wiberg was measured in normal hips in patients between 8 and 75 years of age. Males and females were recorded separately. Means and standard deviations are presented here. The angle increased with growth up to adult age, and then only slowly. In children only values below 15° can be classified as abnormal.

Key words: acetabulum; congenital; dislocation; hip joint

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The Center-Edge angle (CE angle) was introduced by Wiberg (1939) as a measure of acetabular development and/or the degree of displacement of the femoral head. It has been employed almost exclusively in relation to congenital dislocation of the hip and the CE angle here distinguishes normal and so-called dysplastic hips. Wiberg (1939) stated that values over 25° were normal in adults and that values between 20° and 25° were uncertain. This has been confirmed in other investigations (Severin 1941, Wiberg 1944, 1953, Wynne-Davies 1970, Fredensborg 1976). In children, however, there are different opinions about normal values.

The aim of the present study was to investigate the variations in the CE angle with age and sex.

MATERIAL AND METHODS

The CE angle is the angle formed by a vertical line through the center of the femoral head and a line from the center through the lateral edge of the acetabular roof (Figure 1). The center of the femoral head is found with the aid of concentric circles on a transparent sheet. In young children, however, the ossified part of the capital epiphysis is flat which makes determination of the center somewhat difficult. From the age of 8 the center can be measured with accuracy.

Standard pelvic radiograms of normal hips in patients who had been radiographed because of trauma or transient hip pain were used. Ages

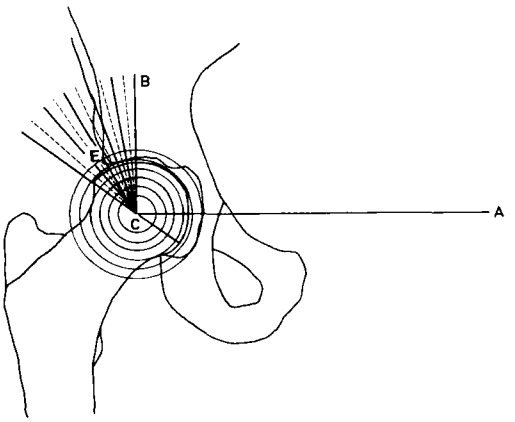

Figure 1. The CE angle according to Wiberg (1939). From the center (C) of the femoral head a line (C–A) is drawn through the center of the head of the opposite side. Perpendicularly to this line and through the center (C) the line (C–B) is raised. The CE angle denotes the angle between the line C–B and a line from C to the acetabular edge (E).

ranged from 8 to 75 years. Each group included 20 hips (10 patients) of both sexes.

RESULTS

Since there was no difference between left and right the sides were pooled. The CE angle was found to increase up to the age of 15 (Figures 2 and 3). After this age there was only a slight increase. The curve was almost identical in both sexes. The standard deviations indicate a considerable variation both in children and in adults.

DISCUSSION

The CE angle is an excellent method of studying the development of the hip joint in radiograms. It is simple and unlike other measurements (Brückl et al. 1972) requires only a few lines to be drawn on the radiogram (Catteral 1968).

The results of the present investigation confirm previous findings. CE angles exceeding 25° in adults are normal and values between 20° and 25° are borderline. In children under 15 years of age, however, 20° or more should be considered as normal and values between 15 and 20° as uncertain.

The small increase in the CE angle after maturation is not accounted for. It may, however, be explained either by marginal, undetectable osteophytes or a decreasing joint space.

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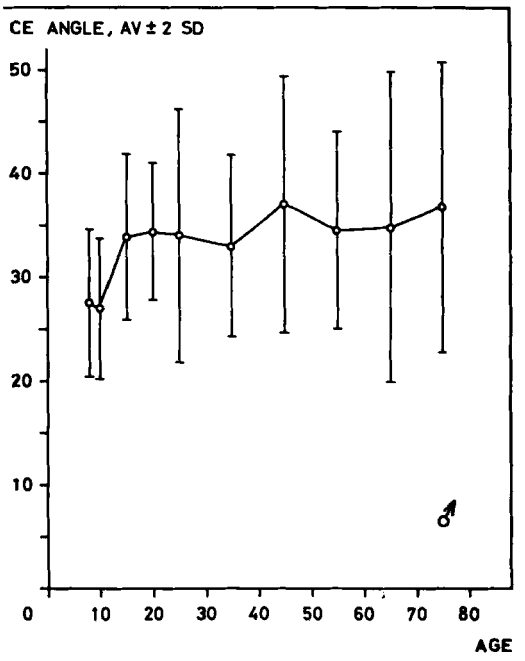

Figure 2.

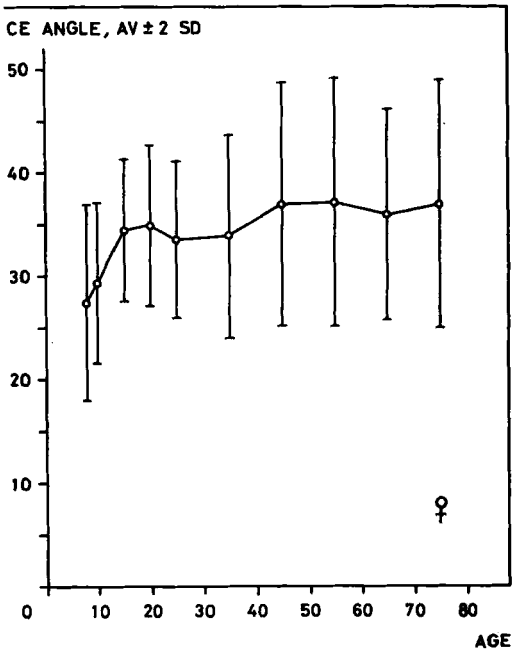

Figure 3.

Figures 2 and 3. The CE angle of normal hips in males (Figure 2) and females (Figure 3). Mean values and two standard deviations.

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