



# POSNA

## The Core Curriculum

### Leg length discrepancy, 2-5 cms

#### Objectives

1. Discuss the rationale for treating leg length discrepancy of  $> 2$  cms
2. Discuss methods available for treatment of leg length discrepancies in the 2-5 cm range
3. Discuss complications resulting from treating leg length discrepancy in the 2-5 cm range

#### Discussion points

1. Is the data base upon which clinical decisions are made a valid one?
2. How much can a bone be acutely shortened without disabling muscle weakness as a complication?

#### Discussion

Discrepancies of more than 2 cms have been documented by motion analysis to have an effect on gait, and are also tolerated less well by patients. There is therefore general agreement at present that an attempt to equalize leg length discrepancies in this range is warranted. There are 2 general strategies; epiphyseal arrest prior to skeletal maturity is generally preferred because of low morbidity, but if that is not possible, acute shortening of a bone, generally the femur, is another option.

Timing of epiphyseodesis is obviously a critical concern; if it is performed too late, undercorrection will result, if too early, overcorrection will result. The latter is particularly objectionable - to finish with the original short leg being longer. Therefore, since the descriptions of Green and Anderson on leg length assessment in children, investigators have been attempting to refine the data analysis to accurately determine timing of epiphyseodesis. It is still an imperfect art. Moseley ingeniously incorporated Green and Anderson's data into a straight line graph which has been widely used for a generation. His data base, however, is still that of Anderson and Green, obtained in the 1940s on children in the Boston area. An attempt to update this information in Dutch children has been reported. No information is currently available on children of African descent. The other factor is skeletal age, as the timing of epiphyseodesis is determined largely from a bone age atlas, again based on data from white children in the first half of the twentieth century. Thus, determining the timing of epiphyseodesis is still a quite imperfect process, and many authors have ventured opinions on whether simply using chronologic age and mathematically calculating correction based on growth rate averages might not do just as well as the formal bone age and growth remaining charts already mentioned. There is no way to formulate an approach other than to review the available information and for each surgeon treating these discrepancies to develop his/her own approach, with a constant eye toward new developments. Despite our soft data base, reasonable, although not perfect, results following planned epiphyseodesis are uniformly reported. Presently in

North America, percutaneous epiphyseodesis is most often performed, there are a number of current publications on the technique. Angular deformity can follow an imperfectly performed epiphyseodesis.

If epiphyseodesis is not feasible, bone shortening procedures can still equalize or reduce leg length discrepancy. Several techniques from open subtrochanteric osteotomy to closed intramedullary shortening have been described. Only up to 10% of the length of a bone can be acutely shortened without unacceptable muscle weakness following. There is an unavoidable transient period of weakness while the muscle-tendon units adapt following shortening.

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