P12

Relationship between Hand Bone Ages and Calcaneal Apophysis Ossification Staging

Seung-Wook No[1*], Yong Min Choi[1], Dong-KI Min[2], Han Seong Choe[3], Soyoung Lee[1†]

Keimyung University Dongsan Medical Center, Department of Rehabilitation Medicine[1], Daegu Health College, Department of Physical Therapy[2], Catholic University of Daegu, Department of Physical Therapy[3]

Introduction

Although hand radiographs are used to assess pediatric growth, the measured bone age range is wide and may not accurate enough to predict when individuals development. In contrast, at the beginning of the ossification of the foot, the height growth tends to be very fast, and can be used to predict the individual's growth spurt. The purpose of this study was to investigate relationship between hand bone ages and calcaneal apophysis ossification staging.

Participants and Methods

A retrospective review of medical records was performed on patients visited the department of developmental rehabilitation clinic from January 2013 to January 2018. A total of 207 patients (mean age: 7.7±3.0 years, Female:Male=106:101) who were taken hand and foot radiographs were engaged. Hand bone age was estimated by Tanner-Whitehous 2 (TW2) methods and foot ossification by calcaneal apophysis ossification staging system. Based on the hand bone age and chronological age, patients were grouped as 'Delayed', 'Normal', and 'Advanced'. Pearson correlation coefficients were calculated in all groups to reveal the relationship between hand bone ages and calcaneal apophysis ossification staging.

Result

When comparing the value of hand bone age and calcaneal apophysis ossification staging, there is a moderate to strong correlation in all group. Statistical analysis of Pearson's correlation showed that strong relationship in 'Advanced' development group ($r=0.783$, $p=0.000$) and moderate relationship in 'Normal' and 'Delayed' development groups ($r=0.541$, $p=0.000$ and $r=0.591$, $p= 0.001$ respectively). In all group, boys and girls were classified, and calcaneal apophysis ossification staging according to their ages were graphically shown. (Fig. 1-3) Relationship between hand bone ages and calcaneal apophysis ossification staging was well correlated.

Discussion

There is a correlation between hand bone age and calcaneal apophysis ossification staging, and the strongest relationship in 'Advanced' development group, following 'Delayed' and 'Normal' group. Calcaneal apophysis ossification staging which is simply used in clinic, can also be used as an important evaluation tool of predicting growth and development.

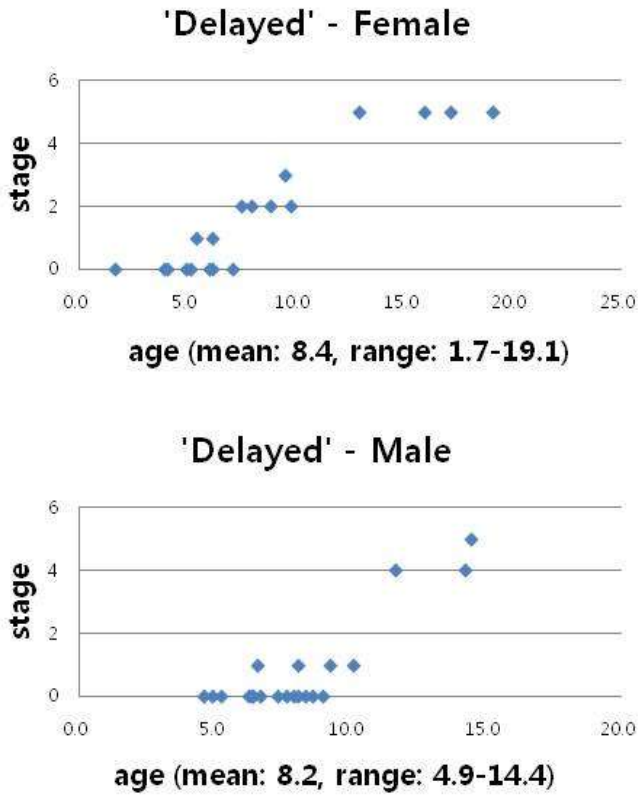

Fig 1. Calcaneal apophysis ossification staging according to ages in 'Delayed' group.

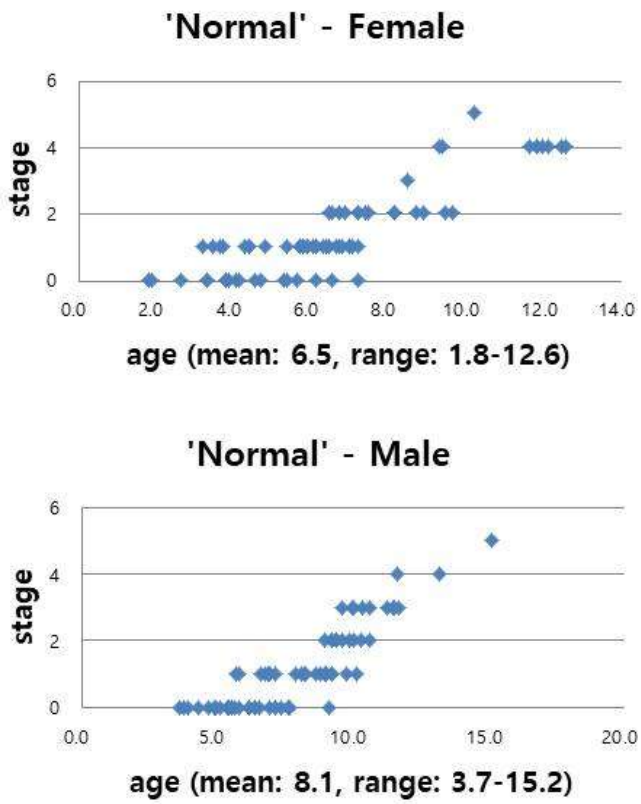

Fig 2. Calcaneal apophysis ossification staging according to ages in 'Normal' group.

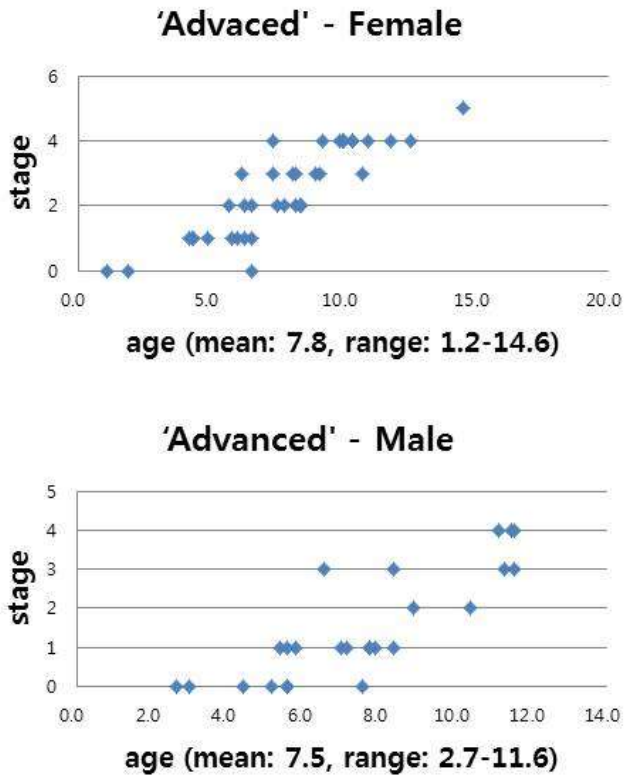

Fig 3. Calcaneal apophysis ossification staging according to ages in 'Advanced' group.