

THE MORPHOMETRY OF THE LUMBAR COSTIFORM PROCESS

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ABSTRACT

The length of the lumbar costiform process was determined and compared at the right and left side of the body, according to sex, on 32 cases. Differences were found, some were significant, depending on the side of the body. For both sexes, a gradual growth of the general average for the right and left lumbar costiform process was observed only for the first three vertebrae, the value at the level of the last two lumbar vertebrae being smaller than at the level of the L3 vertebra.

Keywords: lumbar vertebrae, costiform process, length

Introduction

The costiform processes (Processus costiformis; Processus costalis) are rests of the ribs, being large quadrilateral (rectangular) and flat on the anterior and posterior side, arranged in frontal part (1,2,3,4); the L2 and the L3 costiform processes are better represented (5).

Objective

The purpose of the study is to determine the costiform process length and to compare the right with the left lumbar costiform process length, according to sex.

Material and method

The morphometry was realized in the anatomy laboratory of the Medicine University of Constanta using direct measurements on the bone segment (lumbar vertebra) with a scale ribbon and a slide rule but also by CT scans made on a VCT Lightspeed facility of 64 slices, created by General Electric. The length of the right and left costiform process was compared according with the sex on 32 cases, the results being compared in millimeters.

Results

The lumbar right costiform process length was between 4.6-18.1 mm.

At the level of the L1 right lumbar vertebra the costiform process length was between 11.0-29.7 mm, for the female the length was between 11.0-23.4 mm, and at the male was between 17.7-29.7 mm. (Figure 3, 4)

At the level of the L2 right lumbar vertebra the costiform process length was between 15.0-31.8 mm, for the female the length was between 15.0-31.8 mm, and at the male was between 18.9-31.8 mm. (Figure 3, 4)

At the level of the L3 right lumbar vertebra the costiform process length was between 16.1-34.5 mm, for the female the length was between 16.1-34.5 mm, and at the male was between 24.6-34.5 mm. (Figure 3, 4)

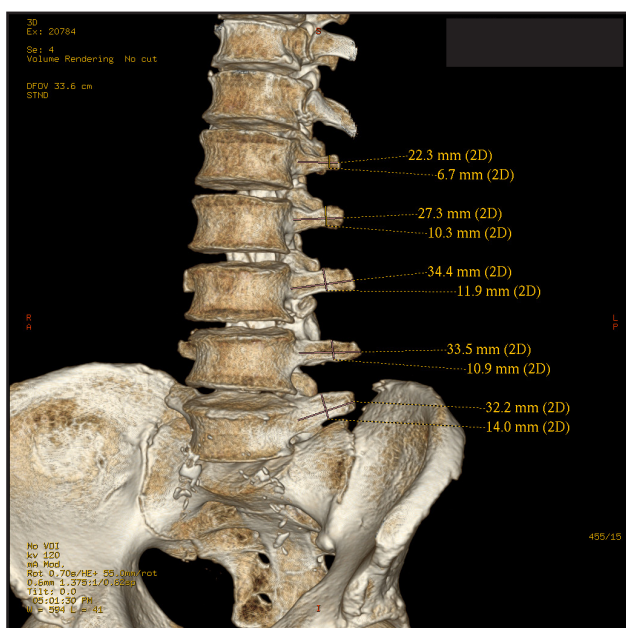


Figure 1 The length of the left costiform L1 process is 22.3 mm and the width is 6.7 mm; the length of the left costiform L2 process is 27.3 mm and the width is 10.3 mm; the length of the left costiform L3 process is 34.4 mm and the width is 11.9 mm; the length of the left L4 process is 33.5 mm and the width is 10.9 mm; the length of the left costiform process L5 is 32.2 mm and the width is 14.0 mm (male)

At the level of the L4 right lumbar vertebra the costiform process length was between 10.7-32.2 mm, for the female the length was between 10.7-29.1 mm, and at the male was between 22.1-32.2 mm. (Figure 3, 4)

At the level of the L5 right lumbar vertebra the costiform process length was between 17.8-37.1 mm, for the female the length was between 17.8-28.8 mm, and at the male was between 19.9-37.1 mm. (Figure 3, 4)

The lumbar left costiform process length was between 10.7-35.7 mm.

At the level of the L1 left lumbar vertebra the costiform process length was between 10.7-29.7 mm, for the female the length was between 10.7-25 mm, and at the male was between 16.3-29.7 mm. (Figure 1, 2, 3, 4)

At the level of the L2 left lumbar vertebra the costiform process length was between 18.4-30.2 mm, for the female the length was between 18.4-30.2mm, and at the male was between 21.3-30.2 mm. (Figure 1, 2, 3, 4)

At the level of the L3 left lumbar vertebra the costiform process length was between 19.6-35.7 mm, for the female the length was between 19.6-32 mm, and at the male was between 27.6-35.7 mm. (Figure 1, 2, 3, 4)

At the level of the L4 left lumbar vertebra the costiform process length was between 17-33.5 mm, for the female the length was between 17.0-24.2 mm, and at the male was between 20.6-33.5 mm. (Figure 1, 2, 3, 4)

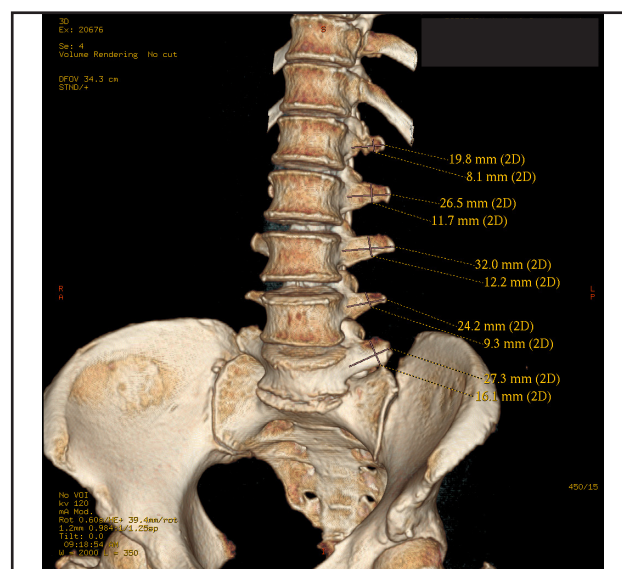


Figure 2 The length of the left costiform L1 process is 19.8 mm and the width is 8.1 mm; the length of the left L2 process is 26.5 mm and the width is 11.7 mm; the length of the left costiform L3 process is 32.0 mm and the width is 12.2 mm; the length of the left costiform L4 process is 24.2 mm and the width is 9.3 mm; the length of the left L5 costiform process is 27.3 mm and the width is 16.1 mm (female)

At the level of the L5 left lumbar vertebra the costiform process length was between 13.4–32.2 mm, for the female the length was between 13.4-27.3 mm, and at the male was between 22.6-32.2 mm. (Figure 1, 2, 3, 4)

Discussions

The length of the right and left costiform process was compared and differences were found, some significant between the two sides of the body.

At the level of the L1 costiform, from 21 cases the right costiform was longer than the left one with 0.3-2.9 mm. In the other 11 cases the left costiform was longer with 1.0-2.5 mm. (Figure 3, 4)

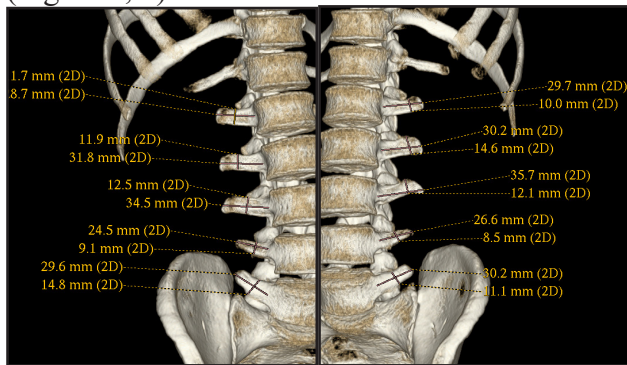


Figure 3 The right costiform L1 is longer than the right one with 1.0 mm, the right costiform L2 is longer than the left one with 1.6 mm, the L3 left costiform is longer than the right one with 1.2 mm, the L4 left costiform is longer than the right one with 2.1 mm, the L5 left costiform is longer than the right one with 0.6 mm (male)

At the level of the L2 costiform, from 21 cases the right costiform was longer than the left one with 0.3-3.4 mm. In the other 11 cases the left costiform was longer with 0.7-1.7 mm. (Figure 3, 4)

At the level of the L3 costiform, from 15 cases the right costiform was longer than the left one with 0.4-1.0 mm. In the other 13 cases the left costiform was longer with 0.2-1 mm. In 4 cases the right and the left costiform were equal. (Figure 3, 4)

At the level of the L4 costiform, from 17 cases the right costiform was longer than the left one with 0.5-4.9 mm. In the other 15 cases the left costiform was longer with 1.5-2.1 mm. (Figure 3, 4)

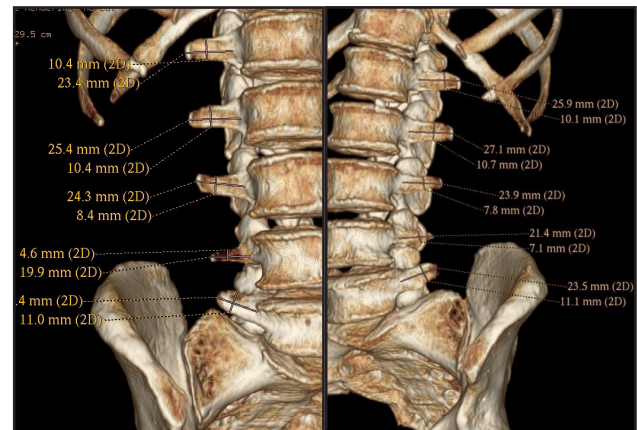


Figure 4 The Left costiform L1 is longer than the right one with 2.5 mm; the left costiform L2 is longer than the right one with 1.7 mm; the right costiform L3 is longer than the left one with 0.4 mm; the left costiform L4 is longer than the right one with 1.5 mm; the left costiform L5 is longer than the right one with 2.1 mm (female)

At the level of the L5 costiform, from 15 cases the right costiform was longer than the left one with 1.5-4.9 mm. In the other 17 cases the left costiform was longer with 0.6-2.7 mm. (Figure 3, 4)

(1, 3, 4, 5, 6, 7, 8) are described the lumbar costiform process, as being bulky, long and narrow, and (5) considers that L2 and L3 are best represented, the shortest being the L1 costiform process. I found that the shortest costiform process was at the level of the L1 left costiform and at the level of the L4 right costiform, both of which were female and the value was 10.7 mm.

Conclusions

At the level of the right costiform process the average length was 23.93 mm, for the male was 25.92 mm and for the female was 21.53 mm.

For the male the average length of the right lumbar costiform process was between 22.48 mm (for the L1) and 29.54 mm (for the L3). For the female the average length of the right lumbar costiform process was between 17.56 mm (for the L1) and 24.18 mm (for the L3). For both sexes we observe a gradual growth of the value of the average length only at the level of the first three right vertebrae, the value of the last two lumbar vertebrae being smaller than at the level of the L3 vertebra.

At the level of the left costiform process the average length was 24.18 mm, for the male

was 26.03 mm and for the female was 21.78 mm. For the male the average length of the general averages of the left lumbar costiform process was between 21.92 mm (for the L1) and 30.62 mm (for the L3). For the female the average length of the general averages of the left lumbar costiform process was between 18.30 mm (for the L1) and 25.16 mm (for the L3). As for the right costiform, we observe a gradual growth of the value of the average length only at the level of the first three left vertebrae, the value of the last two lumbar vertebrae being smaller than at the level of the L3 vertebra.

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