



CWIS Chest Wall Injury Summit 2023

Oral Presentation Abstract Submission

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Title of Presentation Anatomy of the Anterior Ribs and the Composition of the Costal Margin: A Pilot Study

Background

Traditional teaching of rib anatomy and the costal margin contends that the costal margin consists of a combined costal cartilage made up of ribs 7-10. Variations in the anatomy of the 9th and 10th ribs have been observed. We sought to evaluate the variability of interchondral joints and the make-up of the costal margin.

Methods

Cadaveric dissections were performed to evaluate the anatomy of the anterior ribs and the composition of the costal margin. Experienced chest wall surgeons and anatomists evaluated this anatomy through a standardized dissection and assessment. Videos of the dissection were performed to allow for further assessment and review of the anatomy.

Results

Bilateral chest wall anatomy of thirty cadavers was evaluated. In all patients, the first rib attached to the manubrium, the second rib attached to the sternal/manubrial junction, and ribs 3-6 attached directly to the sternum. Interchondral joints were present between ribs 4/5 – 3%, 5/6 – 68%, 6/7 – 83%, 7/8 – 72%. Ribs combining to form a common costal cartilage were observed between 6/7 – 3%, 7/8 – 45%, 8/9 – 30%, and 9/10 – 20%. The 8th rib attached directly to the sternum without joining the 7th rib in 10% of cadavers. The 8th and 9th ribs had free tips in 45% and 60% of evaluations, respectively. The 10th rib was found to have a hooked tip in 25% of cases and was a floating rib without attachment to the 9th rib 52% of the time.

Conclusion

Bridging interchondral joints are common between ribs 5-8. A combined common costal cartilage forming the costal margin is uncommon. Significant variability exists in the chest wall and costal

margin compared to traditional teaching. It is important for chest wall surgeons treating diseases of the costal margin to appreciate this anatomic variability.