Background

The reconstructive challenge with omphalopagus conjoined twins lies not only with the division of shared abdominal organs but also with the closure of what is often a significant skin and abdominal wall defect. The separation procedure requires meticulous planning to ensure an optimal reconstructive design. Preoperative planning of complex reconstructive endeavors has increasingly benefited from the use of commercially available medical models. Custom multi-component medical sculpture can further enhance the effective and functionality of preoperative planning.

Purpose

We present a case of 19-month-old omphalopagus conjoined twins who underwent surgical separation and abdominal wall reconstruction facilitated by the use a two component medical model.

Methods

A life-size model was cast of omphalopagus conjoined twins, which included a circumferential rendition of the lower thorax and abdomen. The model consisted of a foam core (FlexFoam-iT! X; Smooth-On, Easton, PA) simulating the density of the soft tissue, with a silicone-rubber mixture (Dragon Skin Q; Smooth-On, Easton, PA) to simulate the natural elasticity of skin. The interface between the foam and the silicone/rubber layer was easily detachable, allowing the effect of undermining to be simulated. Tissue expanders at different stages of enlargement, were sculpted onto the model to determine the amount of expansion required. The reconstructive design elaborated on the model was utilized during the 20-hour operation that resulted in the successful twins' separation.

Conclusion

Using a two-component model, reconstructive surgery was precisely and easily simulated during varying degrees of tissue expansion. The effects of skin elasticity and surgical undermining were accurately reproduced. With accurate models available in the laboratory, the reconstructive surgeon is allowed an opportunity to design the best possible flap coverage and ensure maximum efficiency in the operating room. We believe the creation of a customized multi-component medical model enhances presurgical planning capabilities for complex reconstructive endeavors.