report a case of an aneurysmal bone cyst of the third metacarpal of the right hand in a 5-year-old child.

CASE REPORT: The patient is an ambidextrous 5-year-old with a 6-month history of swelling of the right hand dorsum centered over the 3rd metacarpal. Imaging studies showed a lytic lesion occupying 90% of the 3rd metacarpal with a mass-effect on the 2nd and 4th metacarpals. At surgery, the bone cortex was egg-shell thin. As much cortex as possible was preserved. The aneurysmal bone cyst was excised and the bone curetted. A cancellous bone graft was harvested from the right iliac crest and packed to fill the defect. Permanent sectioning confirmed the diagnosis. He has been followed for two years since his surgery and there is no evidence of recurrence. He has a full range of motion in the right hand. He is followed for 6-month intervals to monitor for recurrence.

DISCUSSION: The goal of the care of this child was to remove the rapidly expanding bone cyst and to reconstruct the metacarpal, while preserving length, growth potential, and function. To date, this has been accomplished. While curettage has been noted to have a high recurrence rate, the child has not demonstrated any evidence of recurrence at 2 years post-op.

CONCLUSION: We report a rare case of an aneurysmal bone cyst of the hand of a young child treated with curettage and cancellous bone graft. In doing so, the growth plate was preserved, function maintained, and despite reports of high recurrence with curettage and grafting, we have seen no evidence of recurrence in this child.

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Abdominal Dermis Tensile Strength in Aesthetic and Massive Weight-Loss Patients and Its Role in Ventral Hernia Repair: A Cross-Sectional Study

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INTRODUCTION: Skin tissue characteristics have been researched for years, particularly with regard to tissue engineering. Clarifying the biomechanics of abdominal skin could lead to different uses for this tissue such as the ventral repair of hernias in patients with excess skin and incisional hernias. The objectives of this study were to compare the maximum tensile strength of abdominal skin to commercial meshes and to verify whether or not it varies between aesthetic patients and massive weight-loss patients.

MATERIALS AND METHODS: This was an experimental cross-sectional study. Skin samples sized 32x20 mm were taken from 15 abdominoplasties and 10 panniculectomies. The skin specimens were analyzed in vertical and horizontal tensile tests with a device designed for the study. The results were compared between the two groups including their traction directions. Commercial meshes available in Brazil were also tested. The results were analyzed using the Generalized Estimating Equation (GEE), the Winpepi® software for statistical power calculation and Student’s t-test. The study was approved by the local ethics committee.

RESULTS: The aesthetic and post-bariatric groups were similar in most baseline characteristics except age, which was 37.2±9.9 years in abdominoplasty patients and 45.9±8.8 in panniculectomy patients (p = 0.037). The maximum tensile strength supported vertically by abdominal dermis was (mean ± standard-error) 403.5±27.4N in the abdominoplasty group and 425.9±33.9N in the panniculectomy group. Horizontally, the values were 596.5±32.2N and 612.5±43.9N respectively. The strengths between traction directions were significantly different (p < 0,001). There were no differences between the groups with regard to the maximum tensile strength (p = 0.472). Considering our sample size, it is possible to affirm that, if a difference between aesthetic and post weight-loss patients exists, it is lesser than 100N (β=0.15). Tested commercial meshes had the following values: polypropylene 104.6N, low-weight polypropylene 54.4N, polytetrafluorethylene (PTFE) 82.2N, and hydrated porcine small-intestinal submucosa 60.0N.
CONCLUSION: Previous studies were consistent with our results for both the vertical and horizontal dermal forces.2 In our study, the tensile strength of the tested human abdominal dermis samples, both aesthetic and post-bariatric, were superior to the tested commercial meshes. Therefore, in some selected cases, abdominal dermis could be an alternative tool in abdominal reconstruction during panniculectomies with concomitant hernia repair.3

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Adipose-Derived Aldehyde-Dehydrogenase-Expressing Cells Accelerate Re-vascularization of Collagen-Glycosaminoglycan Scaffolds

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INTRODUCTION: Collagen-glycosaminoglycan (CG) scaffolds, also known as dermal regeneration templates, are used for the reconstruction of full-thickness skin defect in patients with extensive resections due to burns, traumatic or inflammatory conditions.1 The natural process of revascularization typically lasts two to three weeks precluding immediate skin grafting. The usage of stem cells has demonstrated to accelerate wound healing. However, stem cell usage requires several steps of cell culturing that preclude using this method in the acute setting. Aldehyde dehydrogenase (ALDH) is an enzyme that plays an important role in retinoid metabolism and is highly expressed in stem cells.2 In this study, we isolated ALDH-expressing cells from subcutaneous adipose tissue and tested them for their potential to enhance healing in a full-thickness skin wound in rats by co-implanting them with CG scaffolds.

MATERIALS AND METHODS: Stromal-Vascular-Fraction (SVF) was obtained from subcutaneous adipose tissue of syngeneic rats. ALDHhi cells were isolated using a fluorescence-activated cell sorting technique with ALDEFLUOR assay kitTM. Each recipient rat underwent four full-thickness wounds creation on the recipient rat’s back, each wound was treated differently. A total of four treatment groups were formed (n=11). Group 1 (control group) consisted of wounds treated with CG and 100 μL normal saline. Group 2 (SVF group) consisted of CG and 1 × 105 cells/cm2 SVF cells. Group 3 (ALDH group) consisted of CG and 1 × 105 cells/cm2 ALDHhi cells. Group 4 (ASCs group) consisted of CG and 1 × 105 cells/cm2 ASCs. Animals were evaluated by histology on day 7 after surgeries.

RESULTS: Scaffolds seeded with ALDHhi cells histologically demonstrated remarkable enhancements in dermal regeneration, vascularization, and collagen growth, if compared to the wound treated with CG alone, CG with SVF, and CG with ASCs groups. Immunofluorescent staining with CD31 emphasized that transplanted ALDHhi cells differentiated into vascular endothelial cells.

CONCLUSIONS: Composite transplantation of CG scaffolds and adipose-derived ALDHhi cells promoted dermal regeneration, not worse than cultured ASC, suggesting that ALDHhi cells could be used in an acute setting as a reliable alternative for cultured ASCs.

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