ABSTRACT

Background: Clinically, scar related complications are observed to be dissimilar in different regions of the body. Unequal distribution of dermal collagen and elastic fibres in different orientations could be one of the multifocal causes of scar related complications, for which this evaluating study has been taken up.

Methodology: Present research work involved the examination of 960 skin samples taken in horizontal and vertical directions from selected areas of Head and neck, Trunk and extremities regions of formalin fixed 32 human cadavers. The samples were processed histologically, employed with routine H&E stain and special Verhoeff-vanGieson stain for the selective demonstration of elastic and collagen fibers. Image analysis was performed using ‘TissueQuant’ software to obtain quantitative fraction values. Paired sample t test and Spearmann’s correlation analysis done using SPSS (15.0) and various ratio values were calculated.

Results: At the head and Neck region, significant differences in quantitative fractions of both collagen and elastic fiber content between horizontal and vertical directions seen at scalp, forehead and neck areas (p<0.05). The submandibular area showed statistically significant difference in its elastic fiber content (p <0.05) only. In lateral canthal area no such differences in both the contents have been identified.

Among the chosen 5 areas of trunk region, abdomen showed the statistically significant difference for both collagen and elastic content (p < 0.05), whereas upper back, presternal, and lateral chest areas showed significant difference (p < 0.05) only for collagen and groin only for elastic content.
At extremities, the differences in the content of dermal elastic fibers between 2 directions were statistically significant at joint areas (shoulder joint, wrist, and ankle) ($p < 0.05$) but for collagen, significant difference was observed at shoulder joint and wrist only. Dermis of the forearm and thigh did not show any differences in their collagen content, while thigh area showed a significant difference in elastic fiber content.

**Conclusion**: Based on the findings of present research project, the differences in the quantitative fraction of dermal collagen and elastic fibers in two different planes of skin in same area is dependent on the subjective factors applicable to the particular region of the human body. In head and neck region it is depending on the varied skin texture and skin lines; in trunk region, it is depending on the anatomical and physical factors, while at extremities it is due to effect of stretch and burst forces. Unequal distribution of dermal collagen and elastic fibers (quantitative fraction) together with the strength of their association (correlation analysis) and pattern of their proportionate changes (ratio analysis) provide valuable guidelines to the aesthetic surgeons in placing elective incisions in the direction which maximally utilize the anatomical facts for aesthetically pleasing result.