PC-I-8. Standardization and threshold of digital subtraction radiography for detecting alveolar bone change

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Background

Radiography is a common diagnostic method for detecting alveolar bone change in practice. Lots of merits made it possible to accumulate extensive radiographic data,

which is important resource for retrospective research related to alveolar bone. For more sensitive and objective evaluation, digital analysis, especially digital subtraction is required. But there are so many factors which influence the comparison of different pairs of images. The standardization of result value and threshold for bony change are necessary.

Materials and methods

In this study, aluminum stepwedge was used for density value calibration. Density value distribution of alveolar bone was found, and then density profiles under various conditions were analyzed. Difference of subtraction result of same aluminum thickness values was shown. How to standardize the result value and precision degree of mm AET were found.

Results

1. The gray value of the alveolar bone distributed from 1 -- 10 mm AET with relatively large standard deviation.
2. Density profiles were linear, log-shape, or exponential-shape type due to the conditions.
3. Same aluminum thickness even in a image can be differently expressed before calibration into mm AET.
4. Gray value distribution of each step is similar to normal distribution, and the threshold for significant change is ± 2 standard deviation.

5. Because of systemic reproducibility limit, the threshold is more than 0.5 mm AET.

Conclusion

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