Data Article

Data of fracture effort in the deformation of the cutting surface of scalpel blades

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A R T I C L E   I N F O

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A B S T R A C T

This article contains data related to the research article titled “Deformation of scalpel blades after incision of gingival tissue in pig mandibles. An ex vivo study” (Díaz et al., 2017) [1]. The presented data give information on the Rheological properties of a number 3 Bard Parker scalpel blades from the Paramount® and Elite® brands. The loss of the cutting capacity of the scalpel blades was evaluated, determining fracture efforts by incisions on gingival tissues. The Elite® brand presented greater efforts (41.40; 52.70; 59.00; 61.17; 64.00; 66.78; 72.15 and 74.18 Newton (N)) than the scalpel blades from the Paramount® brand (49.60; 51.40; 51.90; 52.33; 58.96; 62.24 and 69.08 N). The cutting effort increases with the number of cuts performed by each scalpel blade.

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Specifications table

| Subject area          | Dentistry, Materials Science. |
|----------------------|--------------------------------|
| More specific subject area | Rheology, Resistance of materials |
| Type of data          | Tables and figure             |

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How data were acquired
The fracture stress data on the scalpel blades were obtained using a Shimadzu EZ-S Texture Analyzer. The photographs were taken with a Nikon d7000 camera and a Stereomicroscope of D & D brand Implements, digital to 4.5 magnifications.

Data format
Observations, analyzed.

Experimental factors
Comparative-descriptive study. Commercial use pig mandibles were used. Cuts with 20 scalpel blades per brand were performed. A texture analyzer with force to perform these cuts was used. A stereo-microscope was used to photograph and compare the surface of the scalpel blades before and after being used.

Experimental features
The published data are used to determine the deformation and loss of cutting capacity of the scalpel blades when making incisions on gingival tissues.

Data source location
Faculty of Dentistry. University of Cartagena. Cartagena. Colombia.

Data accessibility
Data are available in this article

Related research article
Díaz, C.A., Tarón, D.A., Hernández, L.R., Camacho, V.A., Fortich, M.N. Deformation of scalpel blades after incision of gingival tissue in pig mandibles. An ex vivo study. Revista Odontológica Mexicana. 21 (3), 2017, pp. 173–179. https://doi.org/10.12988/ces.2018.84180 www.sciencedirect.com/science/article/pii/S1870199X17300563

Value of the data
- Data on fracture efforts at cutting can be used to determine the maximum number of incisions (cuts) that should be performed with the same scalpel blade in a surgical procedure.
- The experimentation model can be replicated for resistance studies of materials and instrumental used in the dental area.
- Data on fracture efforts allow to make comparisons in terms of quality (deformation resistance) of scalpel blades.

1. Data

In this data article it was determined experimentally the values of fracture efforts (cut) of gingival tissues when performing from one to eight successive incisions with number 3 Bard Parker scalpel blades from the Paramount® and Elite® brands. In the Tables 1 and 2, data on fracture efforts from the samples can be observed. The loss of cutting capacity of the scalpel blades from the Paramount® and Elite® brands are related to the number of incisions and the fracture efforts (Newton) when performing between one to four cuts on the tissue. On Figs. 1 and 2 the images of the scalpel blades can be observed before and after performing the cut. Tables 3 and 4 show the variance analysis data of the results.

2. Experimental design, materials and methods

2.1. Materials

In this data article, a number 3 Bard Parker scalpel blades from the Paramount® and Elite® brands, both acquired from commercial houses existent in the market.
### Table 1
Experimental data of the values of fracture efforts (to the cut) of the number 3 Bard Parker scalpel blades from the Paramount\textsuperscript{s} brand.

| Experience | Number of incisions in the gingival tissue |
|------------|-----------------------------------------|
|            | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8          |
| 1          | 49.60 | 51.40 | 51.90 | 52.30 | 58.96 | 65.24 | 69.00 | 71.38  |
| 2          | 49.60 | 51.34 | 52.00 | 52.30 | 58.90 | 65.30 | 69.01 | 71.38  |
| 3          | 48.99 | 51.30 | 52.10 | 52.28 | 58.90 | 65.30 | 69.00 | 71.38  |
| 4          | 48.76 | 51.40 | 51.90 | 52.28 | 58.92 | 65.31 | 69.00 | 71.39  |
| 5          | 49.60 | 51.25 | 51.90 | 52.28 | 58.96 | 65.20 | 69.03 | 71.38  |
| 6          | 49.88 | 51.33 | 51.50 | 52.20 | 58.96 | 65.24 | 69.01 | 71.29  |
| 7          | 47.90 | 51.39 | 51.80 | 52.30 | 58.96 | 65.30 | 69.00 | 71.38  |
| 8          | 48.90 | 51.00 | 51.90 | 52.30 | 58.95 | 65.24 | 69.00 | 71.39  |
| 9          | 49.60 | 51.05 | 51.90 | 52.28 | 58.96 | 65.24 | 69.15 | 71.40  |
| 10         | 49.40 | 51.40 | 51.90 | 52.28 | 58.95 | 65.23 | 69.02 | 71.40  |
| 11         | 49.40 | 51.22 | 51.86 | 52.30 | 58.92 | 65.24 | 69.02 | 71.39  |
| 12         | 48.90 | 51.36 | 51.84 | 52.30 | 58.93 | 65.25 | 69.00 | 71.38  |
| 13         | 49.50 | 51.40 | 51.00 | 52.30 | 58.96 | 65.25 | 69.00 | 71.38  |
| 14         | 49.80 | 51.40 | 52.00 | 52.28 | 58.96 | 65.24 | 69.00 | 71.38  |
| 15         | 49.60 | 51.40 | 51.90 | 52.28 | 58.96 | 65.24 | 69.01 | 71.38  |
| 16         | 49.60 | 51.37 | 51.90 | 52.30 | 58.94 | 65.24 | 69.00 | 71.37  |
| 17         | 49.65 | 51.38 | 51.90 | 52.29 | 58.94 | 65.36 | 69.00 | 71.39  |
| 18         | 49.64 | 51.38 | 51.89 | 52.29 | 58.94 | 65.30 | 60.01 | 71.38  |
| 19         | 49.60 | 51.40 | 51.89 | 52.29 | 58.96 | 65.30 | 69.01 | 71.40  |
| 20         | 49.60 | 51.41 | 51.90 | 52.30 | 58.96 | 65.24 | 69.01 | 71.37  |

### Table 2
Experimental data of the values of fracture efforts (to the cut) of the number 3 Bard Parker scalpel blades from the Elite\textsuperscript{s} brand.

| Experience | Number of incisions in the gingival tissue |
|------------|-----------------------------------------|
|            | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8          |
| 1          | 49.60 | 51.40 | 51.90 | 52.30 | 58.96 | 65.24 | 69.00 | 71.38  |
| 2          | 49.60 | 51.34 | 52.00 | 52.30 | 58.90 | 65.30 | 69.01 | 71.38  |
| 3          | 48.99 | 51.30 | 52.10 | 52.28 | 58.90 | 65.30 | 69.00 | 71.38  |
| 4          | 48.76 | 51.40 | 51.90 | 52.28 | 58.92 | 65.31 | 69.00 | 71.39  |
| 5          | 49.60 | 51.25 | 51.90 | 52.28 | 58.96 | 65.20 | 69.03 | 71.38  |
| 6          | 49.88 | 51.33 | 51.50 | 52.20 | 58.96 | 65.24 | 69.01 | 71.29  |
| 7          | 47.90 | 51.39 | 51.80 | 52.30 | 58.96 | 65.30 | 69.00 | 71.38  |
| 8          | 48.90 | 51.00 | 51.90 | 52.30 | 58.95 | 65.24 | 69.00 | 71.39  |
| 9          | 49.60 | 51.05 | 51.90 | 52.28 | 58.96 | 65.24 | 69.15 | 71.40  |
| 10         | 49.40 | 51.40 | 51.90 | 52.28 | 58.95 | 65.23 | 69.02 | 71.40  |
| 11         | 49.40 | 51.22 | 51.86 | 52.30 | 58.92 | 65.24 | 69.02 | 71.39  |
| 12         | 48.90 | 51.36 | 51.84 | 52.30 | 58.93 | 65.25 | 69.00 | 71.38  |
| 13         | 49.50 | 51.40 | 51.00 | 52.30 | 58.96 | 65.25 | 69.00 | 71.38  |
| 14         | 49.80 | 51.40 | 52.00 | 52.28 | 58.96 | 65.24 | 69.00 | 71.38  |
| 15         | 49.60 | 51.40 | 51.90 | 52.28 | 58.96 | 65.24 | 69.01 | 71.38  |
| 16         | 49.60 | 51.37 | 51.90 | 52.30 | 58.94 | 65.24 | 69.00 | 71.37  |
| 17         | 49.65 | 51.38 | 51.90 | 52.29 | 58.94 | 65.36 | 69.00 | 71.39  |
| 18         | 49.64 | 51.38 | 51.89 | 52.29 | 58.94 | 65.30 | 60.01 | 71.38  |
| 19         | 49.60 | 51.40 | 51.89 | 52.29 | 58.96 | 65.30 | 69.01 | 71.40  |
| 20         | 49.60 | 51.41 | 51.90 | 52.30 | 58.96 | 65.24 | 69.01 | 71.37  |
2.2. Experimentation

As the experimentation model, commercially available ex vivo pig mandibles were used. The scalpel blades were taken to the Shimadzu EZ-S Texture Analyzer with a maximum capacity of 500 N of pressure for the performance of the penetrating mucoperiosteal cuts with a 45° angle. The penetrating incision was performed at a constant speed of 10 mm per minute until the bone structure was reached. The photographs were standardized by using a form, where it was positioned in a unified form and avoiding movements from the scalpel blade (Fig. 1).

2.3. Statistical analysis

The significance of means within the groups of experimental data was evaluated using one-way analysis of variance (one-way ANOVA).
Table 3
Statistical analysis data of the values of fracture efforts (to the cut) of the number 3 Bard Parker scalpel blades from the Paramount® brand.

| Normal statistics | 1 Incision | 2 Incision | 3 Incision | 4 Incision | 5 Incision | 6 Incision | 7 Incision | 8 Incision |
|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Number of values  | 20         | 20         | 20         | 20         | 20         | 20         | 20         | 20         |
| Minimum           | 47.9       | 51         | 51         | 52.2       | 58.9       | 65.2       | 60.0       | 71.29      |
| 25% Percentile    | 49.09      | 51.31      | 51.87      | 52.28      | 58.93      | 65.24      | 69         | 71.38      |
| Median            | 49.6       | 51.38      | 51.9       | 52.29      | 58.96      | 65.24      | 69         | 71.38      |
| 75% Percentile    | 49.6       | 51.4       | 51.9       | 52.3       | 58.96      | 65.3       | 69.01      | 71.39      |
| Maximum           | 49.88      | 51.41      | 52.1       | 52.3       | 58.96      | 65.36      | 69.15      | 71.4       |
| Mean              | 49.38      | 51.33      | 51.84      | 52.29      | 58.94      | 65.26      | 68.56      | 71.38      |
| Std. Deviation    | 0.4677     | 0.1167     | 0.2274     | 0.02231    | 0.02038    | 0.03881    | 2.014      | 0.02282    |
| Std. Error        | 0.1046     | 0.02609    | 0.05085    | 0.002231   | 0.002038   | 0.003881   | 2.014      | 0.002282   |
| Lower 95% CI of mean | 49.16     | 51.27     | 51.74     | 52.28     | 58.93     | 65.24     | 67.62     | 71.37     |
| Upper 95% CI of mean | 49.59     | 51.38     | 51.95     | 52.3      | 58.95     | 65.28     | 69.51     | 71.39     |
| Sum               | 987.5      | 1027       | 1037       | 1046       | 1179       | 1305       | 1371       | 1428       |

ANOVA table
Table analyzed Data 1
One-way analysis of variance
P value < 0.0001
Are means signif. different? (P < 0.05) Yes
Number of groups 8
F 2793
R square 0.9923
Bartlett’s statistic (corrected) 595.1
P value < 0.0001
Do the variances differ signif. (P < 0.05) Yes
ANOVA table
| SS     | df | M5 |
|--------|----|----|
| Treatment (between columns) | 10,611 | 7 | 1516 |
| Residual (within columns)   | 82.5  | 152 | 0.5427 |
| Total                     | 10,694 | 159 |

Table 4
Statistical analysis data of the values of fracture efforts (to the cut) of the number 3 Bard Parker scalpel blades from the Elite® brand.

| Normal statistics | 1 Incision | 2 Incision | 3 Incision | 4 Incision | 5 Incision | 6 Incision | 7 Incision | 8 Incision |
|-------------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Number of values  | 20         | 20         | 20         | 20         | 20         | 20         | 20         | 20         |
| Minimum           | 41.3       | 52.6       | 58.91      | 61.15      | 63.96      | 66.6       | 72.13      | 74.1       |
| 25% Percentile    | 41.39      | 52.69      | 58.96      | 61.17      | 64         | 66.76      | 72.15      | 74.17      |
| Median            | 41.39      | 52.69      | 59         | 61.18      | 64         | 66.78      | 72.15      | 74.18      |
| 75% Percentile    | 41.4       | 52.7       | 59         | 61.22      | 64.1       | 66.78      | 72.17      | 74.18      |
| Maximum           | 41.41      | 52.7       | 59.1       | 61.29      | 64.18      | 66.8       | 72.18      | 74.22      |
| Mean              | 41.39      | 52.69      | 58.99      | 61.19      | 64.03      | 66.76      | 72.15      | 74.18      |
| Std. Deviation    | 0.02403    | 0.02207    | 0.05202    | 0.03407    | 0.05807    | 0.04464    | 0.01572    | 0.02236    |
| Std. Error        | 0.005374   | 0.004935   | 0.01163    | 0.007619   | 0.01299    | 0.009981   | 0.003515   | 0.005      |
| Lower 95% CI of mean | 41.38     | 52.68     | 58.96     | 61.18     | 64.01     | 66.74     | 72.15     | 74.16     |
| Upper 95% CI of mean | 41.4      | 52.7      | 59.01     | 61.21     | 64.06     | 66.78     | 72.16     | 74.19     |
| Sum               | 827.8      | 1054       | 1180       | 1224       | 1281       | 1335       | 1443       | 1484       |

ANOVA table
Table analyzed Data 1
One-way analysis of variance
Acknowledgments

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Transparency document. Supporting information

Transparency document associated with this article can be found in the online version at https://doi.org/10.1016/j.dib.2018.11.141.

Reference

[1] C.A. Díaz, D.A. Tarón, L.R. Hernández, V.A. Camacho, M.N. Fortich, Deformation of scalpel blades after incision of gingival tissue in pig mandibles. An ex vivo study, Rev. Odontol. Mex. 21 (3) (2017) 173–179.