Evaluation of masticatory performance in sclerodermical patient after a perioral lipofilling intervention

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INTRODUCTION

In scleroderma patients, microstomia is one of the characteristic signs of the disease and is caused by an excessive deposition of collagen in the perioral tissues which causes a characteristic thinning of the lips (microcheilia) and compromises access to the oral cavity.

Recently plastic surgery is developing and deepening the use of perioral lipofilling in patients affected by scleroderma not only as an aesthetic intervention, but above all for therapeutic purposes.

This study we want to demonstrate if there is an improvement and stability over time of the masticatory performance with respect

MATERIALS AND METHODS

The test is performed on a sample of patients affected by scleroderma treated with perioral lipofilling with a Coleman technique.

13 female patients, aged between 37 and 64, with scleroderma and undergoing lipofilling with Colemann technique were selected.

The chewing test takes over the materials and methods of the Optocal Brasilian Version (Pocztaruk et al., 2008), already tested and approved, with appropriate modifications adapted to the pathology.

6 pods are weighed and chewed for 40 chewing cycles, then they are spilled and collected in a glass beaker.

The chewed is poured into a paper filter and washed for 10-15 seconds with running water, after which it is placed in the oven at 80 ° for 1 hour and left to dry. The chewed is resumed again and compared with the original weight.

The degree of fragmentation is determined by sieving the chewed through a stack of 4 sieves (with openings from 4mm to 1mm) and a bottom plate and then vibrated for 2 minutes so that the particles are arranged in the various filters.

The particles are again weighed separately for each filter, transforming the partial weight of each sieve, compared with the total weight of the chewed, as a percentage of cumulative weight.

Through the Rosin Rammler formula, the percentage weight is transformed into volume, thus determining the intermediate size of the chewed particles that represents the masticatory performance. In this way, the lower the average size, the better the performance is (Pocztaruk et al, 2009, Pocztaruk, Matheus et al., 2009)

The test and measurement of the oral cavity are performed before the operation and after 1, 3 and 6 months apart.
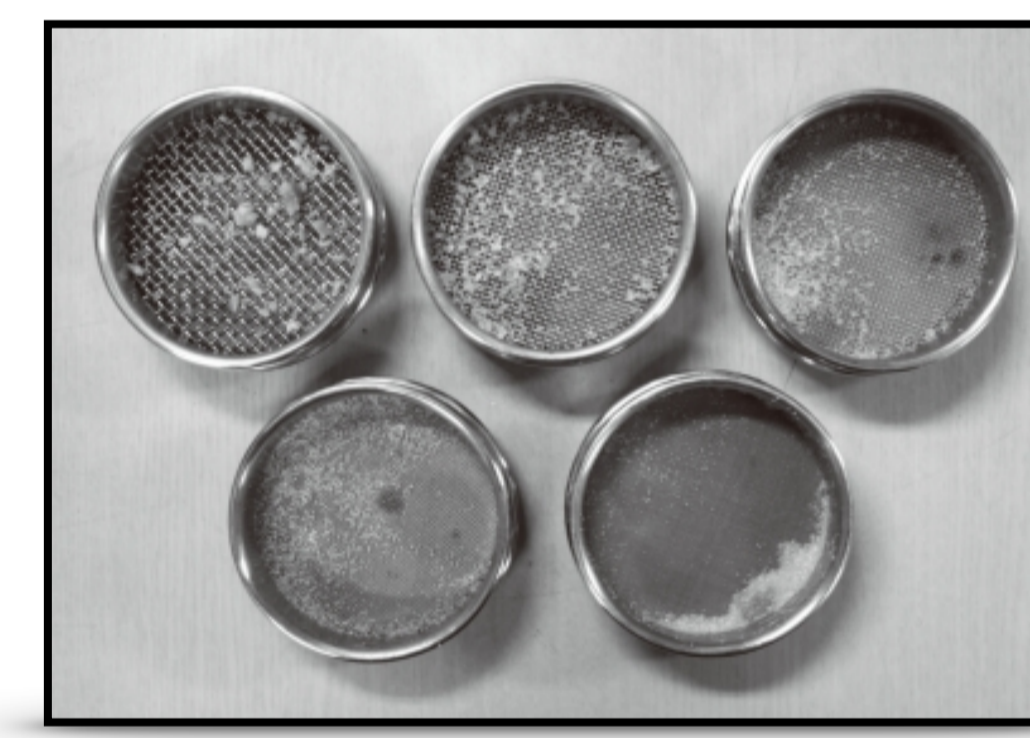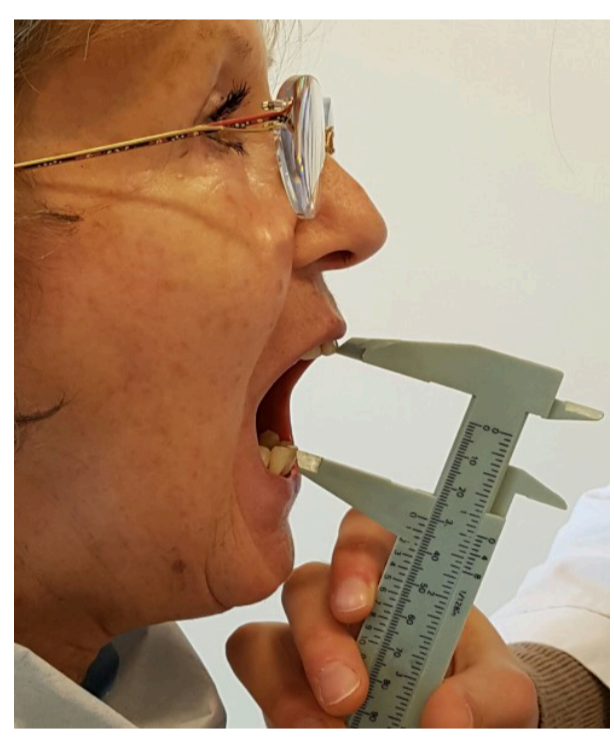
RESULTS

The mastication performance, in the multiple sieve method, is associate basically to the median X_{50} of the sizes of the chewed test food; this median is estimated, for a given individual, by curve fitting of the data obtained by multiple sieving the chewed products to a Generalized Gamma Distribution (Equation (1) of *Arch. Oral Biol.* 49, 155 (2004), hereafter refereed as [AOB]). *In this methodology better mastication performances are associated with smaller values of X_{50}.*

The aim of the present analysis is to investigate if the collected data provide statistically significant evidence for the hypothesis stating that the variable X_{50} changes in different times of observation. The time T_0 corresponds to pre-intervention data, and T_1, T_3 and T_6 correspond, respectively, to data collected 1, 3 and 6 months after the intervention.

The main question of the research is to investigate if there is statistically significant evidence in support of the hypothesis asserting that the intervention is associated to an improvement of the mastication performance of a group of patients.

To have an idea of the *aggregate* variation of the X_{50}, and then to investigate whether there is evidence of changes of the distribution X_{50} in different times, we will focus on the investigation of a specific feature of the *distribution* of the variable X_{50}.

From the results obtained, comparing the masticatory capacity of patients at the baseline and one month after surgery, no objective improvement of the oral cavity is observed. The improvement is generally observed three months after the intervention.

The chewing performance instead shows a marked improvement from the first month.

CONCLUSIONS AND DISCUSSIONS

When we considered individual subjects the analysis was able to show statistically significant evidence for variations in the mastication performance (as measured by X_{50}) for some individuals. However, these changes, when significant, were mixed. We made also an aggregate analysis to investigate if there are changes in the distribution of the variable X_{50} in the samples taken at different times. We found no evidence of changes in the distribution of the X_{50} values in any pair of different samples (time observations).

Now, what could we conclude from the above results, regarding the efficiency of the treatment/intervention to improve the mastication performance of the individuals under study?

Actually, not so much. At this point we just can say that **the collected data do not provide evidence for the efficiency of the treatment/ intervention to improve the mastication performance of the aggregate of subjects under investigation** (individual improvements or worsening may be attributed to the statistical randomness). Further data collection could help to observe such differences in X_{50} if such differences really exist.

However, in order to interpret a positive result of these tests (in the sense that significant differences in the distribution of the values of X_{50}) as a *factor associated with the treatment/intervention* one **should be assured that other factors having an effect (positive or negative) on the mastication performance are under control and are being properly taken into account in the design of the research.**