



Introduction

Introduced in the mid-1960s, polyethers have since become indispensable for impression taking. The precision provided by these materials is well respected.

At the heart of polyether impression materials is a series of key attributes. In addition to hydrophilicity, impression materials also require special rheological properties in order to ensure optimal wetting of the preparation surface areas after syringing around the preparations. With the exception of the two step putty wash technique, the applied compression is very low, especially in case of a deep sulcus or undercut areas, or when using techniques such as the dual arch technique.

Objective

For a study to be clinically relevant, the point in time when the flow properties are analysed also has to be considered. For example, a light or medium body material is applied to the preparation at the beginning of the working time, but the material is finally placed around the preparation at the end of the working time when the tray is seated.

A sophisticated method for analysing flow properties is the Shark Fin test (1-2). To simulate more clinically relevant compression, the test was altered by reducing the weight by the device.

The purpose of this study therefore was to use the Shark Fin test as a method for accurate measurements of the flow properties of light bodied impression materials under low pressure during the working time given by the manufacturer.

Materials and Methods

Seven light bodied precision impression materials, Impregum Soft Quick Step Light Body (3M ESPE, new fast setting materials, Lot: B#174999/K#173527, ImSQ), Impregum Garant Soft Light Body (3M ESPE, Lot: B#174186/K#173527, ImS), Aquasil Ultra LV Fast Set (Dentsply, Lot: 040225, AqULV), Aquasil Ultra XLV Fast Set (Dentsply, Lot: 040306, AqUXLV), Take 1 Fast Set

Materials and Methods (contd.)

Wash (Kerr, Lot: 4-1027, Tak1F), Honigum Automix Light Fast (DMG, Lot: 526203, HoAF), Exafast NDS Injection (GC, Lot: 0311201, ExNDS), Affinis light body fast (Coltène, Lot: MI271, Afff) were tested at room temperature. The materials were automatically mixed using the hand dispenser and directly placed in the receptacle. 25 seconds after start of mix (Test 1) and at the end of the working time given by the manufacturer (Test 2) respectively the entire housing including the Shark Fin mold (weight: 147 g) was released and allowed to sink slowly into the paste. Ten minutes after start of mix the mold was separated and the height of the Shark Fin was measured.

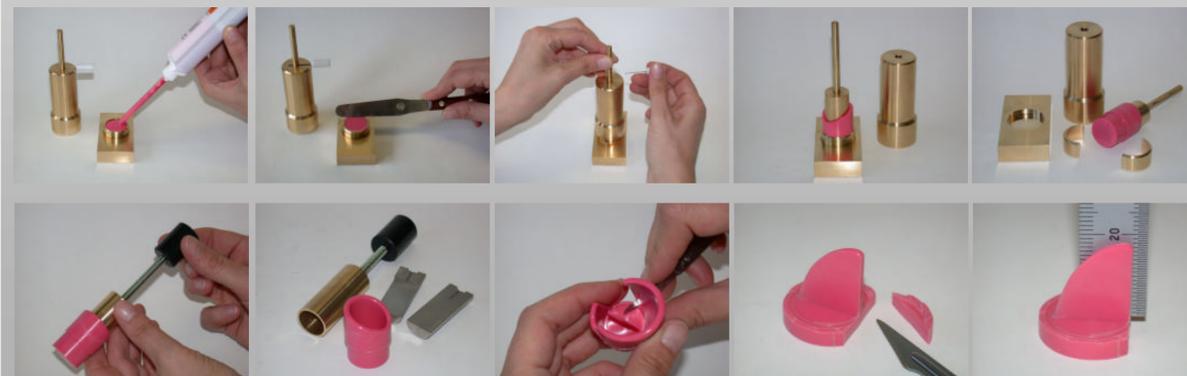


Fig. 1: Shark fin measurement

Results

The average heights (n = 5) of the Shark Fins were compared. Test 1/Test 2 (units in mm, SD in brackets): ImSQ: 23,8/18,5 (0,9/1,5), ImS: 22,1/20,0 (0,6/0,9), AqULV: 6,1/2,4 (0,4/0,4), AqUXLV: 16,5/7,6 (0,4/0,6), Tak1F: 13,0/0,7 (0,4/0,3), HoAF: 12,5/3,5 (0,5/1,2), ExNDS: 14,5/9,7 (0,5/1,2), Afff: 12,3/3,4 (0,8/0,9). Results were analyzed by ONE-WAY ANOVA and Tukey Test (p<0,01). Materials ImSQ, ImS have significantly better flow properties after 25 seconds and at the end of the working time than materials AqULV, AqUXLV, Tak1F, HoAF, ExNDS, Afff.

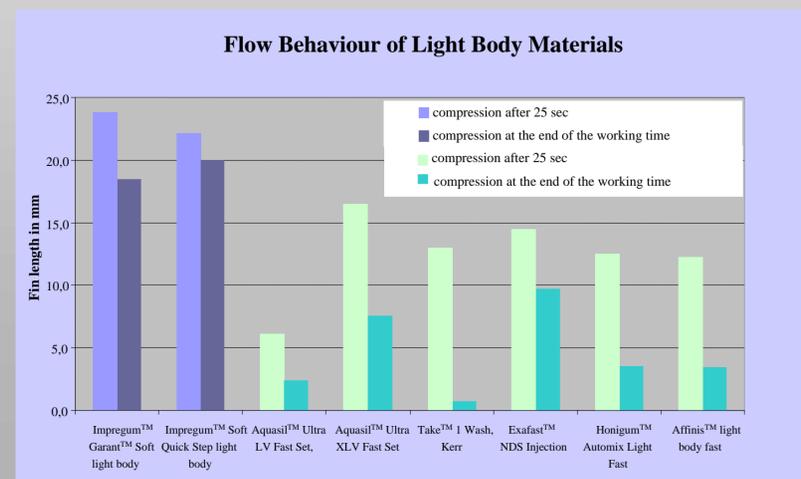
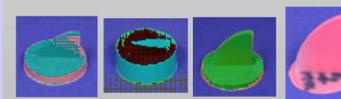


Fig. 2: Results flow behaviour of light body materials

Compression after 25 sec:



Compression at the end of working time:

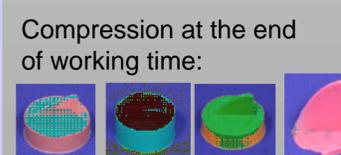


Fig. 3: Shark fin specimen

Discussion

Both polyether impression materials exhibit significantly better flow properties than the tested VPS materials. This is true at the beginning as well as at the end of the working time. It is also important to note that the flow properties of the polyether materials remain comparable throughout the working period.

This can be explained with the snap-set behaviour, which is typical for polyether impression materials. They offer a characteristic profile which is particularly suitable for clinical use. The brief transition between working and setting time, which is typical for polyether, may result in a clinical advantage as the flow properties remain advantageous over the whole period of working time. This enables the materials to easily flow around the preparation, especially at the end of the working time when the tray is seated and therefore of major clinical relevance.



Clinical Photo: Groten, Germany.

Conclusion

The materials ImSQ and ImS showed superior flow properties supporting a high clinical reliability during the whole working time.

Literature

- (1) Vaugen V. et al.; Tufts University School of Dental Medicine Boston, Massachusetts, USA; IADR **1997**, Abstract #3292.
- (2) J. Wirz et al., ZWR, **2004** (4) 126-136.