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In vitro investigation on varios denture base materials wettability

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Authors:
Dr. Alexandru-Titus Farcasiu, Dr. Oana-Cella Andrei,
University of Medicine and Pharmacy "Carol Davila", Faculty of Dental Medicine, Removable Prosthetic Department, Bucharest, Romania

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Introduction

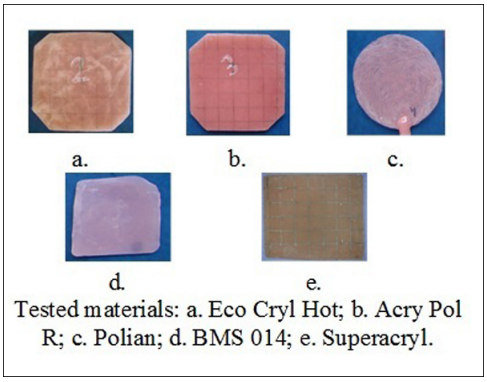
The succesfull complete denture therapy could benefit, in case of xerostomic patient, from studies on wettability of denture base materials with natural or artificial saliva.

Objectives

This in vitro investigation represents a starting point for the use of different methods to improve the hydrophilicity of denture-saliva system, which could increase the quality of life for the xerostomic pactient. Our objective is the evaluation of 4 moulding-type and 1 injection type denture base resins regarding their wetting capabilities with natural and artificial saliva.

Material and Methods

Six unpolished plates of PMMA resin were produced by different labs. The first lab used Eco-Cryl-Hot (Protechno, Spain) and Acry-Pol-R (Ruthinium, Germany), while the second lab utilized BMS 014 (BMS Dental, Italy) and Superacryl (Spofa, Czech Republic). Two different labs produced each one plate of Polyan (Bredent, Germany). The plates were cut in 10x10mm samples. Wettability was expressd after the measurement of the contact angle of unstimulated natural saliva and artificial saliva (Xerostom, Biocosmetics Laboratoires, Spain). The measurement was performed using CAM 101 system (KSV Intruments, Finland) which calculated the mean contact angle for 3 different sesile drops. The measurement system was set to read 20 contact angle values, at 1 second interval, exposing the dynamic nature of the phenomenon. The statistical analysis was performed with SPSS for Windows, v.10.0.1.



Tested materials: a. Eco Cryl Hot; b. Acry Pol R; c. Polian; d. BMS 014; e. Superacryl.

Fig. 1

Fig. 2: Xerostom artificial saliva

Fig. 3

Material	Saliva type	Min.	Max.	Mean	Std. Deviation
Eco Cryl Hot	Natural saliva	61.68	79.83	70.5928	7.4246
	Artificial saliva	40.02	57.44	51.7556	6.1572
Acry Pol R	Natural saliva	72.98	82.49	77.7083	3.7906
	Artificial saliva	36.38	55.01	45.5994	6.1554
Polian	Natural saliva	72.80	89.09	78.9450	6.4310
	Artificial saliva	36.75	48.09	43.0972	3.8008
BMS 014	Natural saliva	78.50	83.34	80.4017	1.7759
	Artificial saliva	39.75	47.74	42.6906	3.2612
Superacryl	Natural saliva	75.48	85.99	80.7956	4.0788
	Artificial saliva	36.53	48.97	42.8311	4.8478

Tab. 1: Mean contact angles with natural and artificial saliva (°)

Results

Artificial saliva wetts the resin 42% better than natural saliva. Eco-cryl-hot is most wettable with natural saliva (70,59°), while Polyan presents la lowest contact angle with artificial saliva (41,06°). Polyan, BMS 014 and Superacryl present the biggest differences (46°) between mean contact angles for artifical and natural saliva.

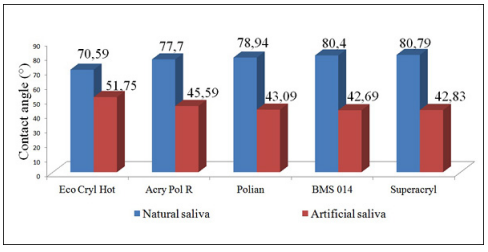


Fig. 4

High wettability	Saliva	SS (p value)	Low wettability
Eco Cryl Hot	Natural	0.010	BMS 014
Eco Cryl Hot	Natural	0.015	Superacryl
BMS 014	Artificial	0.014	Eco Cryl Hot
Superacryl	Artificial	0.019	Eco Cryl Hot

Tab. 2

CAM 101 snapshots revealing the rheologic aspect of saliva-denture base system (images for records no. 1, 5, 10, 15, 20):

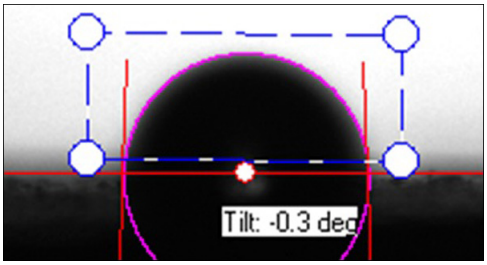


Fig. 5a: Natural saliva

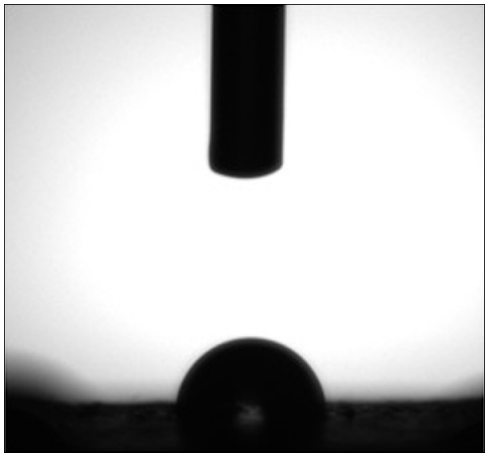


Fig. 5b: Natural saliva

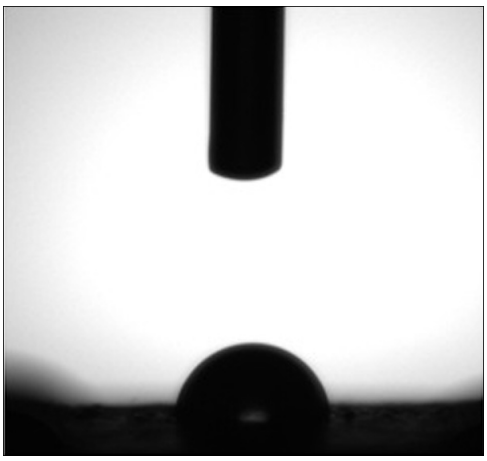


Fig. 5c: Natural saliva

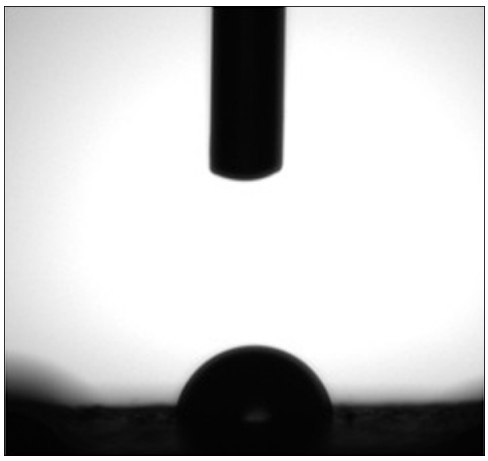


Fig. 5d: Natural saliva

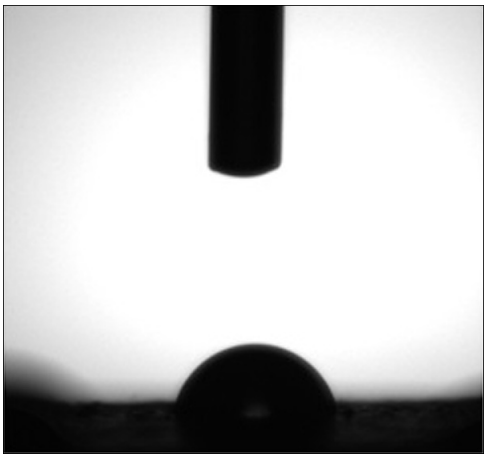


Fig. 5e: Natural saliva

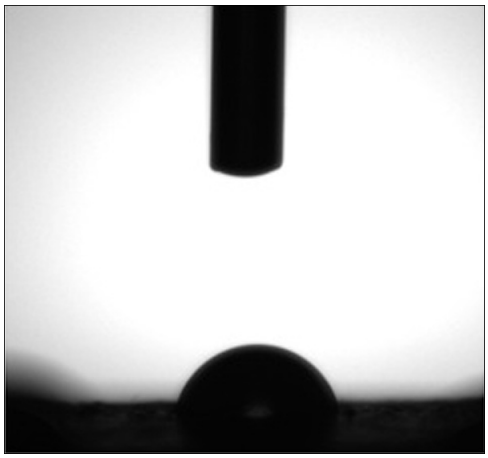


Fig. 5f: Natural saliva

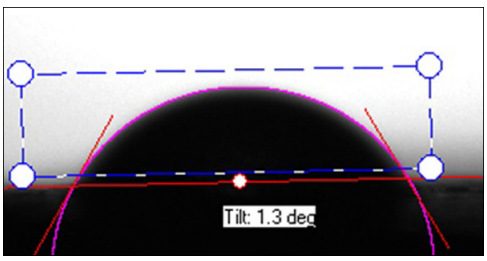


Fig. 5g: Natural saliva

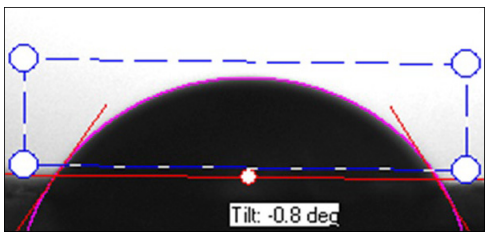


Fig. 6a: Artificial saliva

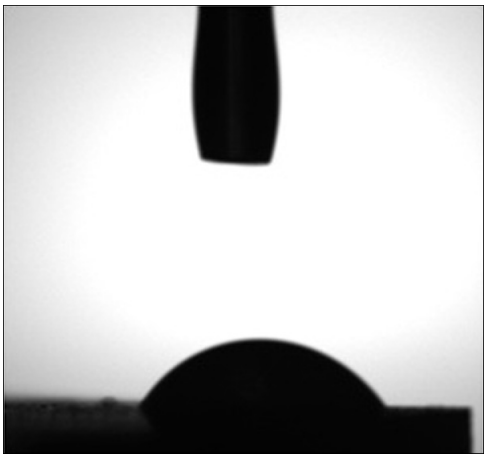


Fig. 6b: Artificial saliva

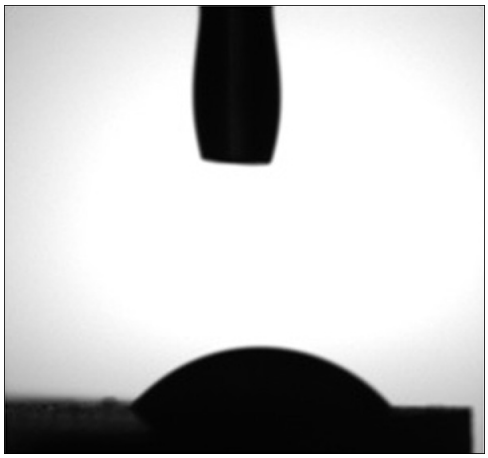


Fig. 6c: Artificial saliva

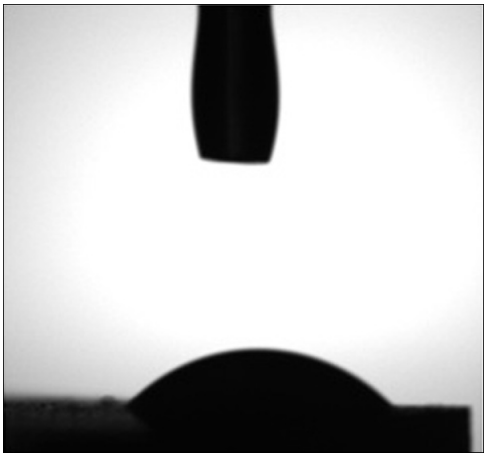


Fig. 6d: Artificial saliva

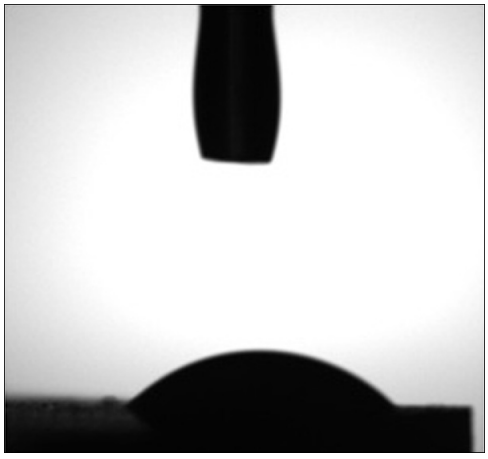


Fig. 6e: Artificial saliva

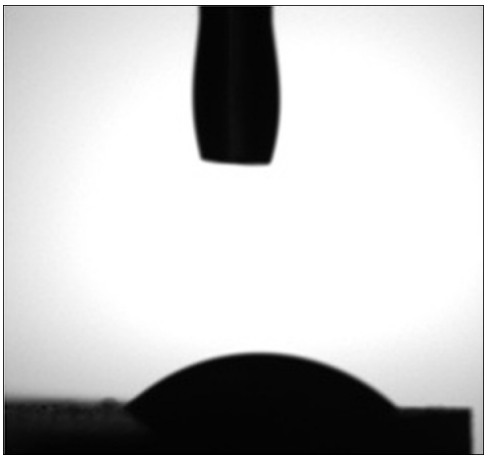


Fig. 6f: Artificial saliva

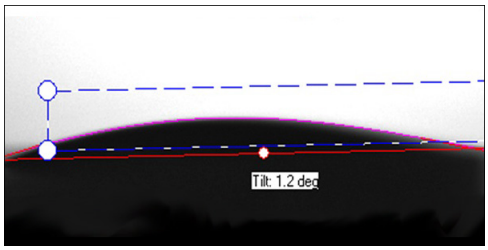


Fig. 6g: Artificial saliva

Conclusions

In the condition of the current in vitro experiment, artificial saliva seems to be more efective for the xerostomic denture wearer, while the measurements for the injection type are less variable, indicating a uniform surface. Further improvement of acrylic surface could improve the condition of xerostomic patient.

This Poster was submitted by Alexandru-Titus Farcasiu.

Correspondence address:
Alexandru-Titus Farcasiu
University of Medicine and Pharmacy "Carol Davila" Bucharest
Faculty of Dental Medicine, Removable Prosthetic Department
Str. Serghei Rahmaninov 76-80
020199 Bucharest
Romania

Poster Faksimile:

IN VITRO INVESTIGATION ON VARIOUS DENTURE BASE MATERIALS WETTABILITY

Alexandru-Titus Farcasiu, Oana-Cella Andrei

Removable Prosthetic Department, Faculty of Dental Medicine,
Carol Davila University, Bucharest, Romania

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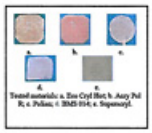

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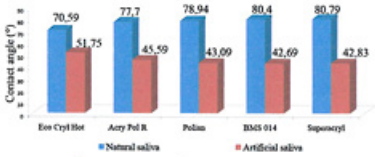

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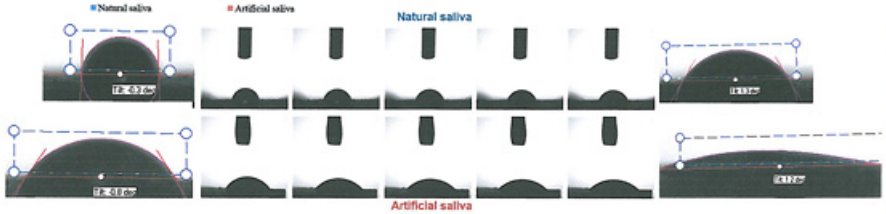

CAM 101 snapshots revealing the rheologic aspect of saliva-denture base system (images for records no. 1, 5, 10, 15, 20).

CONCLUSIONS

In the conditions of the current *in vitro* experiment, artificial saliva seems to be efficient for the xerostomic denture wearer. There are no significant differences between technologies regarding the interaction with natural/artificial saliva. Further improvement of acrylic surface (sandblasting, plasma treatment) remain to be investigated. Dry mouth denture wearer's quality of life can be improved by the careful selection of denture base material and the use of artificial salivas.