

МІЖНАРОДНИЙ ГУМАНІТАРНИЙ УНІВЕРСИТЕТ

ОДЕСЬКИЙ МЕДИЧНИЙ ІНСТИТУТ

МАТЕРІАЛИ

МІЖНАРОДНОЇ НАУКОВО-ПРАКТИЧНОЇ

КОНФЕРЕНЦІЇ

**«АКТУАЛЬНІ ПРОБЛЕМИ КЛІНІЧНОЇ,
ТЕОРЕТИЧНОЇ, ПРОФІЛАКТИЧНОЇ
МЕДИЦИНИ, СТОМАТОЛОГІЇ
ТА ФАРМАЦІЇ»**

8-9 квітня 2016 р.

м. Одеса

CLINICAL ORIENTED TECHNOLOGIES OF QUALITY
ASSURANCE ORTHOPEDIC TREATMENT:
COMPARATIVE EVALUATION PHYSICAL
AND MECHANICAL PROPERTIES OF ACRYLIC PLASTICS
POLYMERIZED WITH COLD TEMPERATURE

Yanishen I. V.

Doctor of Medical Sciences,

Associate Professor, head of prosthetic dentistry department

Berejna E. O.

PhD in Medical Sciences,

Associate Professor of prosthetic dentistry department

Fedotova O. L.

assistant of prosthetic dentistry department

of Kharkiv National Medical University

Kharkiv, Ukraine

Plastics of cold polymerization are using in dentistry to repair (rebase) dentures, repair of prostheses, the manufacture of temporary prostheses, tires on parodontal diseases, models, and other.

Manufacturer of removable prosthesis consists of many stages. The first is impression, after that there will be some technological stages in the dental laboratory. These includes obtaining the model, setting the teeth, making a wax model, making gypsum model in the dental ditch and removing, decoction of wax, and then filling the resulting space with forming material for the manufacture of bases of the dental prosthesis or with the basic material.

A comparative assessment of quality acrylic plastics polymerized with cold temperature was conducted jointly with the colleagues of the Central laboratory of JSC «Stoma» (Kharkov, Ukraine) according to the requirements of international standard ISO-10139-certified plastics: «Ethacryl» («Stoma», Kharkov), «I'toraks» («Stoma», Kharkov), «Vertex Castapres (the Netherlands). Physico-mechanical investigations of plastics polymerized by cold temperature was researched by the following parameters: deformation with compression, bending voltage, impact viscosity, abrasion resistance, amount of residual monomer, water absorption at 360 test samples.

In terms of deformation with compression, as confirmed by the results of laboratory tests, all the materials conform to the requirements of ISO-10139, but most significantly ($p < 0,05$) making difference the material

«Vertex castapres», because the rate of deformation under compression, which is the smallest, and is (3,7±0,1)%, in that time the material «Redont» is (3,9±0,2)%, and «Protocal-M» is (4,0±0,1)%. For these materials are obtained and the corresponding qualimetrics indicators, the information content varies (0,151±0,232) bits and, accordingly, is: «Protocal-M» - 0,151 bit, «Redont» - 0,179 bit, «Vertex castapres» - 0,232 bit.

The indicator bending voltage, study materials by 20-30 per cent higher than the indicative values ISO-10139 that can ensure the strength of the basis under dynamic loads. So, for Vertex castapres» bending voltage is (86,6±4,0) MPa, whereas for Redont» - (82,5±3,0)MPa and the «Protocal-M» - (77,8±4,0) MPa. For these materials are obtained and the corresponding relative standard qualimetrics indicators that ranged from (0,217±0,311) bits.

The impact viscosity of the samples of materials that have cold polymerization for production of the base is characterized by a significant margin of safety that exceeds the comparative indicative value ISO-10139 (40±80)%. However, the use of the material «Vertex castapres» is (5,4±0,5) kJ/cm² and significantly ($p < 0,001$) higher than the corresponding figure for material «Redont» - (4,1±0,3) kJ/cm², and for the material «Protocal-M» (4,3±0,2) kJ/cm², which provides appropriate qualimetrics indicators of the investigated materials within (0,330±0,471) bits.

Abrasion resistance polymerizate characterized by the highest ($p < 0,001$) resistance for the material «Protocal-M» - (54,5±0,5) kJ/cm², whereas the materials Redont» and «Vertex castapres» for this property are inferior to similar and, at the same time be exceeded ISO-10139 (50±60)%. These patterns and reflected qualimetrics indicators whose values are within (0,424±0,474) bits.

As explained in the analysis of laboratory data, the level of water absorption of samples of materials - limit in respect of the indicator ISO-10139 and reliably from him and studied analogues have no difference ($p > 0,05$), and ranging (28,8±29,6) mg/cm³. At the same time, the level of residual monomer samples made of the researched materials at the time of their manufacture are characterized by an excess of residual monomer, which consequently make lower the quality of design of the dental prosthesis and requires consideration in polymerization technology of plastics for targeted reduction of the unit weight of residual monomer.

Generalized analysis of the studied properties indicates the presence of specific qualitative profile for each of the plastic cold polymerization.

Keywords: acrylic plastic, physico-mechanical properties, dentures.

References:

1. Ричард ван Нурт: Полимерные матрицы для базисов съемных зубных протезов/ Ричард ван Нурт// [Электронный ресурс].– Режим доступа: <http://www.medbe.ru>.
2. Ноюровская И.Я.: Стоматологическое материаловедение/ Ноюровская И.Я// Учебное пособие КГМУ. 2007. – С. 192.
3. Трезубов В.П.: Ортопедическая стоматология. Прикладное материаловедение / Трезубов В.П., Штейнгарт М.З., Мишнев Л.М.// Учебник для медицинских вузов.– С.-П. – Спецлит. – 2001. – С. 143-149.
4. Акуленко А.Л.: Съемные протезы – качественно и просто/ Акуленко А.Л., Варнавский С.В. // Стоматологический вестник №4, 2009.
5. Гурьев А.В. : Изготовление пластиночных протезов из пластмасс холодного отверждения методом компрессационной полимеризации// Новое в стоматологии. – 2005. № 4. – С. 124-126.
6. Аболмасов П.Г.: Ортопедическая стоматология: Руководство для врачей, зубных техников, студентов стомат.фак.вузов/ Аболмасов П.Г., Аболмасов П.П., Бычков В.А., Аль-Хаким А.// Смоленск. с. 575.
7. Консейкин В.П.: Руководство по ортопедической стоматологии/ Консейкин В.П. – М. – Триад-Х. 2004. с.495.
8. Лебедево И.Ю.: Руководство по ортопедической стоматологии. Протезирование при полном отсутствии зубов/ Под ред. Лебедево И.Ю., Каливрадзяна Э.С., Ибрагимова Т.П.// Учебное пособие для студентов. – М. – Мед.инфор.агентство. 2005. с.400.