



Quantification of Flow Salivary and Ph in Elders Healthy and Radiated Using Mouthwashes Based on Quercus Illex.

GLORIA PATRICIA PEREA GONZÁLEZ

Department of Clinical Area, Faculty of Estomatologia Benemérita Universidad Autónoma de Puebla, Puebla, Mexico.

BLANCA ESTRADA ESQUIVEL

Department of Clinical Area, Faculty of Estomatologia Benemérita Universidad Autónoma de Puebla, Puebla, Mexico.

MAURA CÁRDENAS GARCÍA

Biomedicine Lab, Faculty of Medicine Benemérita Universidad Autónoma de Puebla, Puebla, Mexico.

HAZEL CORDERO PEREA

Undergraduate Senior Student, Faculty of Medicine Benemérita Universidad Autónoma de Puebla, Puebla, Mexico.

ABSTRACT

Geriatric patients increase the risk of acquiring various systemic illnesses such as hyposalivation and xerostomia. Proper chewing prevents gastric, and malnutrition. For the geriatric patient with head and neck cancer, radiation treatment attack the malignant cells but also healthy cells, oral and perioral tissues, presenting oral lesions during and after radiation, causing Mucositis, Xerostomia, periodontitis diminishing the patient's quality of life. In order to keep both groups of patients, whether healthy or in radiotherapy treatment, the proper oral health status, the use of mouthwashes based on Quercus illex prevent and reduce the incidence of periodontal disease, hyposalivation and xerostomia. The clinical results show that salivary pH in both groups of elderly postoperative treatment with mouthwash on Quercus illex passed of acid to neutral, with respect to the salivary flow in healthy older adults increase for 0.85ml/m to 0.92 ml/m and the patients with pathology added was for 0.45 ml and/m to 0.66 ml/m, giving them the chance to improve their functionality of the stomatognathic system.

KEYWORDS

Hyposalivation, xerostomia, saliva, healthy elder and radiated elder

Introduction

In general, when the human being ages, he gives little importance to the oral cavity. It is theorized that tissue metabolism changes over time¹, i.e. there are morphological and physiological changes in all normal tissues of the elder. The changes associated with aging are multiple and served on all organs and body systems, although they vary according to age and gender. The morphological and functional changes that occur with age and take place in the oral cavity become part of the biological aging process; there is a significant number of older adults in general who present diseases in the supporting tissues such as periodontal and in the stomatognathic system, causing hyposalivation, xerostomia and consequently loss of masticatory functions^{2,3}.

During aging, oral health problems are more complex, physiological changes or gradual deterioration as psychomotor disability are presented, hampering proper oral hygiene and leading over time to periodontal disease, gingival recession, loss of periodontal attachment and support bone; others are pathological diseases due to action of drugs such as Xerostomia; by cultural and economic factors, improper education on the topic increases the risk of getting various diseases. Therefore, oral age-related changes may be by the process of biological aging and as a result of accumulation of internal physiological factors that induce functional and structural biochemical changes.^{4,5,6,7}

In the elder, there is a high incidence and prevalence of diseases, such as head and neck cancer. Over 65% of all malignant neoplasms occur in the elder⁷. Cancer is the result of uncontrolled cell group that subsequently as a survival strategy, acquire certain invasive capacity that allows them to migrate and colonize other tissues and organs proliferation.⁸

Head and neck Cancer comprises anatomical regions that due to its location and lymphatic dissemination has several stages, histopathological diagnoses and hence different treatment alternatives. It is more common among males than females with peak incidence from the 5th and the 6th decade of life.⁸ According to statistics of incidence, mortality and prevalence of cancer (Globocan 2005 International Agency for Research on Cancer) on mouth and pharynx worldwide for males is 7.1 and for women is 3.8.⁹

Among the chemical factors related to mouth and pharynx cancer is smoking and it is responsible for at least 96% of lung cancer in men in Western countries and these relate to 30% with larynx, oral cavity and esophagus tumors.¹⁰

Among the treatment options for the elder with head and neck cancer is radiotherapy, which affects malignant cells but also healthy oral and perioral tissues, presenting injuries during and after radiation, leading to Mucositis, Xerostomia, Dysgeusia, Ageusia, Dysphagia, infections, caries, gingivitis, periodontitis and osteoradionecrosis¹¹ that are severe complications derived from head and neck radiation therapy, referring to a bone disorder in which there is bone devitalization with hypovascularization, hypocellularity.^{12,13,14}

The geriatric patient is often diagnosed with Mucositis, periodontitis and some of the aforementioned lesions; these lesions, but more intense with a longer and painful period of time due to a smaller pool of stem cells in the mucosa are observed in the elder undergoing on radiation.

The characteristic clinical signs of periodontitis include loss of clinical attachment and alveolar bone, periodontal pocket formation, gingival inflammation and caries. This can also be as-

sociated with a gingival overgrowth or recession, bleeding on brushing while chewing and during the poll, increased tooth mobility, periodontal pockets, pain, drainage reaching out to tooth loss.¹²

Another aspect to consider is that the geriatric patient often begins to stop eating for various reasons including lack of oral hygiene, lack of dental organs, hyposalivation and xerostmia ill-fitting plates or periodontal problems causing them pain when chewing that leads to malnutrition. In the malnourished elder, his immune system is compromised, affecting individual susceptibility to infection, therefore, nutritional support is vital for every human being, but if he seems to be affected by any disease, he cannot chew food properly because of local discomfort.¹³

The goals of nutritional support are to prevent malnutrition and its complications. The quality of nutritional support in the cancer carrier does not vary substantially from any other patient, but it is important to keep in mind that the carrier patient has alterations in metabolism, so he must maintain a good nutritional support to bear up with cancer treatment and to reduce the risk of complications.⁹

For the healthy elder, it becomes complicated the food intake when having problems, as it is painful to chew food; for the radiated elder, with the same condition, it is shown the same signs and symptoms of the disease, but he also shows due to the cancer treatment nausea, vomiting, anemia, xerostomia, bleeding, infection by simplex herpes or Candida albicans, little taste perception in cancer therapy.^{9, 15} The oral mucosa will be more frequently affected in this type of treatment and thus infections manifest, because the potential is high, since there is immunosuppression and the absence of oral epithelium integrity, there is from erythema or local ulcerations up to complete loss of epithelium with hemorrhage and intense pain.¹⁵

For the reasons described, the goal of the research is quantify the flow salivary and pH in healthy and radiated elderly, using mouthwashes based I Quercus Ilex as a preventive measure or to reduce xerostomia and hyposalivation.

Quercus ilex belongs to the family of Fagaceae, in some regions; the leaves are used as astringent and anti diarrhea. The catkins of some species are used for vertigo and epilepsy. The Quercus ilex is not a toxic plant, it is rich in tannins, phenolic, quercetic, palmitic, stearic, oleic, linoleic, gallic, starch and pectin acids.¹⁶

The aqueous extract of Quercus ilex has a high tannin content (15% to 17%) used in wound healing by creating a dry environment, preventing the development of bacteria.^{17,18,19}

Methodology

Design: transversal, comparative, observational clinical cohort. Sample of 100 healthy elders (50 men, 50 women) and 100 (50 men, 50 women) head and neck radiated elders attending dental consultation at the Graduate Clinic of the Faculty of Dentistry (Fall 2013-2014) both genders, age range 60-70 years.

In the Clinic:

The selected patients went to dental practice at the Graduate Clinic of the Faculty of Dentistry. It has been made Clinical history, signing informed consent supported under the Declaration of Helsinki, indications for postoperative and saliva collection delivery in written, scheduling appointments for monitoring patients enrolled in the project.

Selecting the sample considering the variables of age, localized periodontal disease, no smoking, no alcohol, healthy patients who do not pursue any systemic disease, not having ingested any drugs either; for radiated geriatric patients includes the first four variables by adding radiotherapy for head or neck cancer. Pre and postoperative salivary flow samples collection was proceeded in both groups of patients in order

to identify and quantify the pH salivary flow by joining the main dominant factors in oral disease. Brushing technique was directed. The research was carried out into two phases. The first collection for both groups was fulfilled preoperative at Quercus Ilex treatment; were indicating the use of Quercus Ilex-based mouthwash three times daily after each brushing, was performed postoperative salivary collection for both treatment groups with the mouthwash was executed. It followed up on the patients 3, 7 and 15 days

Taking pre and postoperative salivary sample was made considering the guidelines of the ANAIS under the runoff technique in sterile pre-weighed tubes.

At the Laboratory of Biomedicine:

A calibrated potentiometer with standard solutions of 4, 7 and 10 pH was used. The tubes were placed in the pre and postoperative salivary samples in the diode potentiometer, recording the results of the readings to determine the pH of the saliva samples.

Regarding the salivary quantification, tubes with and without salivary flow were weighed and they were taken to the Ohaus Explorer Analytical Balance; after that pre and post-treatment results were emptied and compared to both groups of patients.

Results

The average results pre-treatment yield that 100% of enrolled patients (without and with cancer) had an acidic pH (5.9 / 5.7)

For the phase corresponding to the post treatment mouthwashes, the results of the average, on the fifteenth day passed a salivary pH of 6.5 without cancer and cancer salivary pH of 7.1 which corresponds to the neutrality of the solution.

Performing the Salivary analysis, denote increase in unstimulated salivary flow the average results are presented in detail in Table 1, which are significant for both groups postoperative to the mouthwash use.

Average results 200 elders	Preoperative w/o mouthwash healthy-radiated	Postoperative w/o mouthwash healthy-radiated	Postoperative w/ mouthwash healthy-radiated
pH	5.9/5.7	6.1/6.0	6.5/7.1
			Statistically significant (P=0,2)
Salivary flow (5 min)	4.34±0.85 ml 2.60±0.45 ml	4.54±0.88 ml 2.72±0.49 ml	4.92±0.92ml 3.89±0.66 ml
			Statistically significant (P=0,2)
Localized Periodontitis	100% of patients with localized periodontitis	10% healthy 25% gingivitis	15% gingivitis
		65% periodontitis	85% healthy

Table 1: Results of the average patient group both genders that were involved using Quercus Ilex-based mouthwash

Discussion

Considering that chemotherapy and radiation as treatment methods for head and neck cancer are aggressive and according to Gonzalez Moles in Caribé-Gomes F¹⁵, they generate toxic effects on normal cells in 40% of treated patients carriers of risk factors and predispose to oral complications such as hyposalivation and xerostomia, dental calculus, pre-existing oral and dental diseases, periodontal disease and poorly

adapted prosthesis, that is why it is urgent to find alternatives and implement preventive measures for risk factors mentioned above. In analyzing the results of the clinical efficacy of the mouthwash QI-based, we observed that are a preventive measure besides lessening the oral complications because of hyposalivation and xerostomia, in both groups of elders.

Another radiation-induced changes in the oral cavity, is xerostomia and mucositis, which are more debilitating consequences of treatment experienced by patients undergoing radiotherapy. Vissink and cool.,²⁰ mentioned that the administration of pilocarpine or pure cholinergic sialogogues stimulates any residual salivary gland function after radiotherapy, but the beneficial effect depends on the dose distribution in the parotid glands. When the dose is 10 mg., it presents adverse consequences such as sweating and gastric sequel, and other minor cholinergic effects. Burlage and cool., mentions that its effect is after 12 months.

With the use of the mouthwash, there have not been adverse effects so far, its action is immediate (See Table 1) and if the patient ingests it, there are no contraindications due to between the uses, it is indicated for gastric ulcer healing.

Other drugs that have been reported to be important in the treatment for either healthy or radiated elders for hyposalivation or xerostomia that might show up is to include anetholtrithione and cevimeline. As the stimulant properties of these sialogogues are of short duration, patients have to use them for the rest of their lives.²¹

According to Scarantino C y cool.,²² the results of the quality of life scales showed no significant difference between pilocarpine and placebo groups regarding xerostomia and mucositis.

For research effects, the treatment to follow has been to recommend patients during and after treatment with chemotherapy or radiotherapy to consume food from five to six times

a day, avoiding excessive condiments and also drinking from two to three liters of water daily. The use of chewing gum is not appropriate because elders often bite their cheeks or tongues besides presenting dental discomfort when chewing. The use of the mouthwash thrice a day after each brushing has increased the salivary flow of patients improving the quality of life for both groups and thereby avoiding the use of drugs for long periods affecting the gastric mucosa.

Considering the studies of Sreebny LM²³, about abnormal salivary flow values (0.15 ml / min); in this study, for unstimulated saliva samples the lowest was 0.45 ml / m. taking into account the effect of the of QI, the flow was increased to 0.66 ml/m, allowing the radiated elders to have a proper diet and to improve their digestion by good cud-chewing.

Conclusions

Postoperative use of Quercus ilex increases salivary flow and neutralizes the pH, it also decreases bacterial reproduction, postoperative discomfort of the periodontal treatment, and tissue recovery, keeping it healthy, promoting periodontal health for both groups.

Taking into account that the healthy patient is predictable from periodontal problems because of hyposalivation and xerostomia, which can be prevented and patients who are undergoing chemotherapy or radiotherapy, they might maintain an adequate periodontal state avoiding discomfort and side effects at the level of oral cavity, with the use of Quercus Ilex mouthwashes as precautionary measures.

Postoperative use of Quercus ilex accelerates periodontal tissue recovery time, in addition to keeping it healthy, increasing saliva flow and neutralizing the pH, decreasing bacterial reproduction, postoperative discomfort of the periodontal treatment, promoting periodontal health for both groups. Other secondary oral diseases to Rx are reduced to radiated elders. It should be rectified in both groups the brushing technique though.

REFERENCES

- [1] Bates, FJ. Adonis, D. Stanford, DG. Structural and functional changes of the oral cavity. Dental treatment of geriatric patients. Modern Manual 1986; 63. [2] Silva González B. López, L. González Huidobro. Prevalence of oral pathology and related structures of the J region of the state of Mexico. Rev ADM 1995;11(3):130-2. [3] Ortega Velasco D. Oral aging. In: Bollón Fernández, P. Velasco Ortega D. Geriatric Odontostomatology: integral odontology care of the geriatric patient. Madrid: Coordinación Editorial IMC; pp.159, 164-6. 1996. [4] Velasco, E. Oral aging. In Bullon, P; Velasco, E. (Ed). Geriatric Odontostomatology. Madrid. SmithKline & Beecham, pp. 159- 173. 1996 [5] Bollón Fernández P. Velasco Ortega E. Geriatric Odontostomatology: integral odontology care of the geriatric patient. Madrid: Coordinación Editorial IM&C; p.2, 29. 1996. [6]. Pan American Health Organization. Ageing and health: a paradigm shift. Rev Panam Salud Pública 2000; 7(1): 60 – 7. [7] Cormack EF. A saúde oral do idoso [online] 2002 March 11 [access date 25 July 2015]. | Available at: <http://www.odontologia.com.br/artigos.asp?id=174&=19&kr=s> [8] Lodovico Balducci, Martine Extermann. Biological Basis of Geriatric Oncology | Cap 1 Ed Springer. USA. Pp. 1-7. 2005 [9] Gil Hernández, A., Nutrition Treaty, Tome 4, clinical Nutrition. Ramirez Tortosa, MC., Cambor Alvarez, M., García Peris, P., Cancer and nutrition. Chp. 24 Pp. 549-551 Ed. Médica Panamericana., 2010 [10] Ruiz A, Rivero J, Pena A, Pinar B, Hernández M, Lara P. Head and neck cancer. Biocancer 1 (2004):1-15. [11] Cedeño M., J.A., Rivas, R. N., Tuliano C., R.A., Oral manifestations of patients undergoing radiotherapy in head and neck, patterns of dental care. Venezuelan dental Act. February 2014; 52(1): 96-99. [12] Herrera Herrera, A., Díaz Caballero, A., Herrera Barrios, F., Fang Mercado, LC. Osteoradionecrosis as side effect of radiotherapy. Advances in dentistry 2012; 28 (4): 175-180 Vol. 28 - Núm. 4 – 2012 [13] BASCONES MARTINEZ, A. y FIGUERO RUIZ, E.. Periodontal diseases such as bacterial infections. Advances in Periodontology [online]. 2005, vol.17, n.3 [cited 2015-07-31], pp. 147-156. Available at: <http://scielo.icsii.es/scielo.php?script=sci_arttext&pid=S169965852005000300004&lng=es&nrm=iso>. [14] Bórquez, P., & Romero, C. (2007). The cancer geriatric patients. Chilean magazine of surgery, 59(6), 467-471. Retrieved on 25 November 2014, from: | http://www.scielo.cl/scielo.php?script=sci_arttext&pid=S071840262007000600015&lng=es&tlng=es. 10.4067/S0718-40262007000600015 [15] Caribé Gomes F, Chimenos-Küstner E., López-López J, FinestresZubeldia F, Guix-Melcior B. Dental management of complications of radiotherapy and chemotherapy in oral cancer. Med Oral 2003; 8:178-87. [16] The world of plants. Quercus Ilex. Available at: <http://www.botanical-online.com/medicinalscencia.htm> [Retrieved on 15 December 2011]. [17] Aquino, Y. D. y Bueno. Z. J. (1981) Determining the tannin content of the bark of five forest trees in the Peruvian Amazon. Peru forest Magazine, 10 (1-2), 1-10. [18] Andresek, S. B., Simonovska, I., Vovk, P., Fyhrquist, H., Vuorela and P. Vuorela. (2004). Antimicrobial and antioxidative enrichment of oak (Quercus robur) bark by rotation planar extraction using 5 Extra Chrom. Int. J. Food Microb. 92, 181 – 187. doi: 10.1016/j.jfoodmicro.2003.09.009. [19] Lock, O. Phytochemistry research, Method in the Study of Natural Products. Lima: Fondo Editorial PUCP. 1994 [20] Vissink, A., Mitchell, J. B., Baum, B. J., Limesand, K. H., Jensen, S. B., Fox, P. C., Reyland, M. E. (2010). Clinical management of salivary gland hypofunction and xerostomia in head and neck cancer patients: successes and barriers. International Journal of Radiation Oncology, Biology, Physics, 78(4), 983–991. <http://doi.org/10.1016/j.ijrobp.2010.06.052> [21] Johnson JT, Ferretti GA, Nethery WJ, Valdez IH, Fox PC, Ng D, Muscopolat CC, Gallagher SC. Oral pilocarpine for post-irradiation xerostomia in patients with head and neck cancer. N Engl J Med. 1993 Aug 5;329(6):390-5. [22] Scarantino C, LeVeque F, Swann RS, White R, y cool. Effect of pilocarpine during radiation therapy: results of RTOG 97-09, a phase III randomized study in head and neck cancer patients. J Support Oncol. 2006 May;4(5):252-8. [23] Sreebny, L. M. (2000). Saliva in health and disease: an appraisal and update. International Dental Journal, 50(3), 140–161. DOI: 10.1111/j.1875-595X.2000.tb00554.x.]