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A narrative review on the use of lip trainer (Patakara) in oral rehabilitation

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ABSTRACT

The spent time on body exercising is usually given more interest than the exercise of lips, especially after the wide evidence-based demonstrated effects of strong lips on the general health and hence the quality of life. Oral rehabilitation leads to a powerful closure of the lip that can be the first-line defensive mechanism against the many oral dysfunctions as halitosis, snoring, mouth breathing and dryness, and dysfunctions of the oro-gastrointestinal system. The strong lip seal or closure gained from the continuous use of lip muscle trainer (Patakara) not only limits the deteriorated normal physiological oral functions that are associated with the ageing process but also can be considered a good oral rehabilitation device to many oral dysfunctions such as halitosis, snoring, mouth breathing and dryness, and dysfunctions of the oro-gastrointestinal system. Incorporating the use of lip muscle trainer in traditional physiotherapy and rehabilitation programs — especially for geriatrics — is a fundamental part of the whole treatment plan. Physiotherapists must direct their attention toward Patakara utilization in future oral rehabilitation studies to augment and affirm more benefits for this hopeful device. Advising the family relative or caregivers to encourage the elderly to use the lip muscle trainer for maintaining a strong lip is very important.

Key words: Patakara, oral rehabilitation, oral health, lip muscle trainer

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Introduction

The complex feature of lip closure can be accomplished by the integration of variant numbers and types of movements of the orbicularis oris muscle (OOM), with additional face muscles that have fibres moving in all directions around the perioral complex [1]. Since it can influence various daily activities, the functional strong lip is vital to remember [2]. Many functions — such as talking, chewing, and swallowing — belong to the action of OOM [3].

The process of ageing-related steady decline in muscular quality, strength, and mass is the general definition of sarcopenia [4]. Sarcopenia-related functional and structural changes appear in all body parts involving the tongue and lip muscles, oral and perioral complexes, and oral sensation [5]. Increased ageing-related tooth loss is a predisposing factor for weak tongue and labial muscles [6]. Atrophy, smaller fascicles and bundles, and changed fibre shape are the main reported form and consistency ageing-related changes of OOM [7].

It is important to maintain an effective labial closure because the strength of OOM decreases with the ageing process, resulting in an incomplete labial closure and unhealthy oral medium due to the saliva evaporation. Weak labial closure and decreased tongue movements — in cerebrovascular neurological insults — negatively impact chewing, digestion, and swallowing in the oral cavity [3].

Strength of orofacial musculature and, hence a strong labial closure is gained by the repeated performance of oro-facial muscle contractions via electro-stimulation [8] or oral rehabilitation devices including lip muscle trainer (Patakara) [9]. Although Patakara is not a relatively new device, studies on it are very limited. This narrative analysis, therefore, seeks to discuss the benefits of Patakara on oral health.

Origin and history of Patakara

In the early 1900s, in the field of orthodontic therapy, with the help of orofacial muscular training, Rogers introduced oro-myofunctional appliances (OMFA) to

the patients with growing malocclusion to correct the unusual pattern of deglutition, treating the myofunctional and/or myoskeletal problems [10], focusing on the normal swallowing and nasal breathing, improving the balance of oro-facial musculature, and to promote mandibular development [11].

Oro-facial training is an individualized rehabilitation regimen of resisted or active free oro-facial movements. Oro-facial training aims to correct or affirm the normal tongue posture, treat the imbalance of facial musculature, regain the tongue-cheek muscular balance, correct the abnormal chewing and swallowing patterns, and normalize the neuromuscular functions of the oro-facial complex [12]. OMFA emerged the idea of OMT-based devices because in 2000 Dr Akihiro, a Japanese dentist, invented the Patakara. This is a simple, non-invasive, easy-to-use, oral-rehabilitation device used to enhance oral health (by strengthening labial closure), and hence the quality of life (QoL) of the elderly [13].

Segments of Patakara

The highly elastic plastic Patakara [14] is made from a polyester-elastomer material (this material is a very highly elastic rubber-polymer-plastic composite) [9]. Due to its resilience, Patakara is designed to be placed between the upper and lower lips in the oral cavity to improve the conditioning of oral musculature [14]. Patakara consists of two parts: the first part (enters that oral cavity and is called as Pataleara which is considered as the fundamental big part with two sides, upper and lower sides) and the second part (plastic tabs) (Fig. 1).

Guidelines of Patakara use

Firstly, close the mouthpiece. Insert the Pataleara between teeth and lips. Without clenching the teeth, the person must contact the upper side to the lower side of Pataleara via closing lips for five minutes. During this time, the patient is ordered to constantly touch the tip of the tongue to the incisive papilla. During the five-minute lip closure, the person is ordered to perform at least 10-repetition stretching-movement by maximally drawing the plastic tabs of Patakara to front, right, left, upper, and lower directions without letting the device to be released from the oral cavity (this can be applied by the continuous firm closure of upper and lower lips during the exercise). This five-minute session may be repeated 5 times daily [15].

Patakara indications

Patakara can be used to address many oral dysfunctions as snoring, mouth breathing and dryness, halitosis, and oro-gastrointestinal dysfunction [13].

Restoring the normal breathing from the nose

Respiration is normally conducted from the nose. Conduction of respiration from the mouth or nose and mouth more than six months is defined as the habit of mouth breathing (MB). MB is related to ageing-related OOM and labial closure weakness, halitosis, mouth dryness, dental caries [16], the tongue's low resting position, weakness of oro-facial muscles [17], and dysfunction of dilating muscles of airways that present in obstructive sleep apnoea (OSA) [18].

OOM is the fundamental muscle included in the labial closure. From the middle of the fifth age decade, labial closure strength (LCS) begins to decrease to meet its minimum value at over 80 years [19]. Weak LCS and tongue elevation induce mouth breathing and snoring during sleeping. The gained appropriate LCS and tongue elevation by Patakara correct the breathing from oral to the nasal pattern. Patakara declines the apnoeic symptoms in patients with OSA by increasing the strength and force of OOM [15] in addition to improving the oxygen saturation [20].

Snoring problem

In the elderly, snoring is a very common health problem with some related risk factors, such as obesity and a large neck circumference [21]. It is understood that during sleep, most snorers exhibit a pattern of mouth breathing. Snoring can be theoretically decreased by increasing the pharyngeal airway space by shifting the tongue anteriorly to recompense for the lost neuromuscular function of genioglossus muscle (the main muscle of pharyngeal opening) [22]. Repetitive anterior placement of the tongue to the incisive papilla during the Patakara oral training may enlarge the upper airway space. Wide upper airway space corrects snoring by shifting the breathing pattern from oral to nasal breathing [15].

Halitosis (bad mouth malodour)

Halitosis negatively affects the social and psychological QoL in many subjects suffering from this embarrassing health problem [23, 24]. Development of malodorous substances and, hence halitosis is produced from the dry mouth that induces the growth of anaerobic and gram-negative bacteria. OSA, ageing, mouth breathing [20], and systemic disorders such as diabetes [25] are commonly associated with dry mouth. Using Patakara increases saliva flow [20] that eliminates halitosis by lowering the number of oral bacteria and enhancing the wetness of oral mucosal tissue in geriatrics [26]. Also, increased upper airway space in patients with OSA in addition to the return to normal nasal breathing pattern [15].

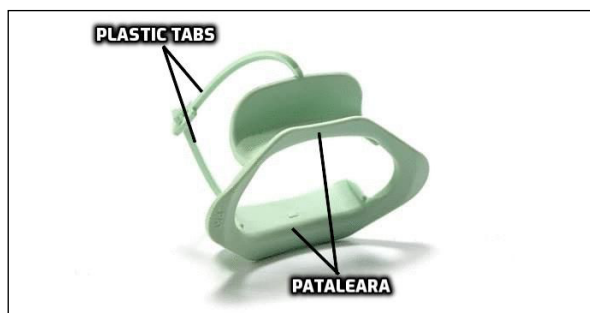


Figure 1. Segments of Patakara

Mouth dryness

The subjective symptom of decreased saliva secretion is the definition of dry mouth or xerostomia, whereas the objective finding of low saliva flow is hyposalivation [25, 27]. Xerostomia and hyposalivation are risk factors for periodontitis, dental caries, local oral and systemic infections, feeding and swallowing problems, and upper gastrointestinal dysfunctions [28].

Oral training by Patakara can improve the saliva flow, wetness of oral mucosa [14], and oral pain that may present in geriatric-related chronic periodontitis [26]. Hypofunction of the salivary reflex arch (afferent arm, salivary nucleus, and efferent arm) in addition to the progressive cellular loss of the motor nervous system (including the facial nerve and its supplying facial muscles) — is reported with the ageing process. Repeated contractions and stretching to oro-facial muscles — with the help of Patakara training — trigger the afferent receptors and branches of the facial nerve in facial muscles that, in turn, stimulate the salivary nucleus in the brain that activate the efferent arm (salivary glands) to increase the production saliva flow [14].

Oro-gastrointestinal dysfunctions

Ageing-associated physiological hypofunctions occur in many physiological processes of the body including swallowing. This changed swallowing process in the elderly occurs due to the declined neuromuscular reserve [29], teeth loss, less-efficient mastication, decreased density and cross-sectional area of jaw muscles [30], declined volume and pressure of tongue muscle (it produces the adequate force to transit the chewed food parts to the pharynx), down-shifted location of the larynx in some geriatrics, the overspread of pharynx cavity, and the large-timed and small-sized opening of the upper-oesophageal sphincter [29].

The involved tongue isometric strengthening exercises [31] during Patakara training [15] can improve swallowing dysfunctions. The repeated isometric ex-

ercises of the tongue can improve the ageing-related declined capacity of motor functions of the tongue, enhance tongue pressure and strength, control the food bolus, and hence improve the dietary-intake functions in the geriatric mouth [32].

In eating disorders, Patakara can boost the geriatric QoL as the oro-facial muscle training can boost nasal respiration due to the corrected integration between the nasal cavity, the location of the tongue, the larynx, and the airways. Patakara-induced parasympathetic stimulation may be the cause of improved salivation in addition to the enhanced subjective symptoms of gastrointestinal dysfunction such as epigastralgia, early satiety, constipation, and anorexia especially in geriatrics with poor nutrition [19].

To gain the normal dietary functional intake, it is noted that using food in oral rehabilitation raises the risk of pulmonary aspiration. The frequent use of a lip muscle trainer (Patakara) in the rehabilitation of oral and/or eating dysfunctions can lower the risk of pulmonary aspiration and further raises the value of geriatric lip closure training [33].

Conclusions

The strong lip seal/closure gained from the continuous use of lip muscle trainer (Patakara) not only limits the deteriorated normal physiological oral functions that are associated with the ageing process but also can be considered a good oral rehabilitation device to many oral dysfunctions such as halitosis, snoring, mouth breathing and dryness, and dysfunctions of the oro-gastrointestinal system. Physiotherapists must direct their attention toward Patakara utilization in future oral rehabilitation studies.

Conflict of interests: *The author declares no conflicts of interest.*

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