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EXPERIENCES OF EUROPEAN SPEECH AND LANGUAGE THERAPISTS ON THE USE OF FACEFORMER® DEVICE IN CLINICAL WORK

Faculty of Social Sciences
Master's Thesis (Logopedics)
January 2022

ABSTRACT

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Master's Thesis
Tampere University
Degree Programme in Logopedics
January 2022

Orofacial myofunctional therapy is a non-speech rehabilitation method that shifted from its original field of dentistry to speech and language therapy. Speech and language therapists use orofacial myofunctional therapy in the rehabilitation of both pediatric and adult clients—for example, with their clients with swallowing difficulties, drooling, or speech sound disorders. The goal of orofacial myofunctional therapy is to strengthen and improve the mobility, function and postures of the muscles needed when speaking, breathing, and swallowing.

Myofunctional training devices are part of orofacial myofunctional therapy, and FACEFORMER® (FF) is one example of a non-customized, soft, and flexible myofunctional training device. According to the FF developers, the device strengthens the muscles of the face and the mouth area. The official training program consists of exercises, in which the FF is placed between the teeth and lips and is used actively during the day and passively at night. Active day exercises include, for example, pressing the lips against the device's wedge and pulling the FF by hand in different directions, while the user resists the pulling by squeezing their lips together. The idea of the nighttime passive use, in turn, is that the device activates the mouth area for several hours. Since there is no research available about the use of the device, it is important to study for which client groups and in what ways FF has been used, and how speech and language therapists have ended up using FF.

In this study, the experiences of European speech and language therapists (N=54) using a myofunctional training device, FF, in clinical work were investigated by an online survey. The study highlighted four areas of rehabilitation in which FF was used: nonverbal oral motor skills, breathing, swallowing, and articulation errors. Most therapists had prepared individual training instructions for their clients. Nearly half of the therapists had advised using FF during the nights in addition to doing the exercises given by the therapist. Some therapists had advised following the FF's developers' training program, and some had advised using FF only during the nighttime. Most typically, the training period reported in this study lasted six months, which is also the period recommended by the FF developers. Speech and language therapists had familiarized themselves with FF either through a colleague, at a training session, or by discovering it themselves while looking for information to support rehabilitation.

The results of this study suggest that speech and language therapists in Europe might at least be willing to try newer rehabilitation methods, even though there is no research evidence on their effectiveness yet, and in some cases, also implement it as part of their rehabilitation work. Based on the results, speech and language therapists seem to use FF quite boldly and open-mindedly with their clients with different disorders, although systematic guidance and research results are not yet available.

Keywords: FACEFORMER®; orofacial myofunctional therapy; speech and language therapy; survey

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TIIVISTELMÄ

Johanna Virkki: Eurooppalaisten puheterapeuttien kokemuksia FACEFORMER®-harjoitusvälineen käytöstä kliinisessä työssä
Pro gradu -tutkielma
Tampereen yliopisto
Logopedian tutkinto-ohjelma
Tammikuu 2022

Orofakiaalinen myofunktionaalinen terapia on kuntoutusmenetelmä, joka kehitettiin alun perin hammaslääketieteen puolella, josta se on sittemmin siirtynyt puheterapiaan. Puheterapeutit käyttävät orofakiaalista myofunktionaalista terapiaa sekä lapsi- että aikuisasiakkaiden kuntoutuksessa – esimerkiksi asiakkailtaan, joilla esiintyy nielemisvaikeuksia, kuolaamista tai artikulaation ongelmia. Orofakiaalisen myofunktionaalisen terapian tavoitteena on vahvistaa ja parantaa puhumisessa, hengittämässä ja nielemisessä tarvittavien lihasten liikkuvuutta, toimintaa ja asentoja.

Myofunktionaaliset harjoitusvälineet ovat osa orofakiaalista myofunktionaalista terapiaa, ja FACEFORMER® (FF) on yksi esimerkki räätälöimättömästä, pehmeästä ja joustavasta myofunktionaalisesta harjoitusvälineestä. FF:n kehittäjien mukaan sen käyttö vahvistaa kasvojen ja suun alueen lihaksia. Välineelle on valmis harjoitusohjelma, jonka mukaan FF asetetaan hampaiden ja huulten väliin, ja sitä käytetään aktiivisesti päivällä ja passiivisesti yöaikaan. Aktiivisiin päiväharjoituksiin kuuluu esimerkiksi huulten puristaminen FF:n kiilaa vasten. Lisäksi harjoitukset sisältävät FF:n vetämistä käsillä eri suuntiin, jolloin laitteen käyttäjä samaan aikaan vastustaa vetoa puristamalla huuliaan yhteen. Yöaikaisen käytön ajatuksena on puolestaan se, että laite aktivoi suun aluetta useiden tuntien ajan. Koska aiheesta ei ole olemassa aiempaa tutkimusta, oli tärkeää saada tietoa paitsi siitä mihin ja miten FF:a on käytetty myös siitä, miten puheterapeutit ovat päätyneet käyttämään laitetta kuntoutusvälineenä.

Tässä tutkimuksessa selvitettiin eurooppalaisten puheterapeuttien (N=54) kokemuksia myofunktionaalisen harjoitusvälineen, FF:n, käytöstä kliinisessä työssä. Tutkimuksessa nousi erityisesti esiin neljä kuntoutuksen osa-alueita: nonverbaali oraalimotoriikka, äännevirheet, hengitys ja nieleminen. Suurin osa puheterapeuteista oli itse laatinut FF-harjoitteluohjeet, joita asiakas noudatti. Lähes puolet vastaajista oli laatinut asiakkaalle harjoitusohjeet, joissa asiakasta ohjeistettiin käyttämään FF:a myös yöllä. Osa puheterapeuteista ohjasi asiakkaitaan noudattamaan FF:n valmistajan harjoitusohjelmaa ja osa käyttämään FF:a ainoastaan yöllä. Tyypillinen raportoitu käyttöaika oli kuusi kuukautta, mikä on myös FF:n kehittäjien suositteluajanjakso. Puheterapeutit olivat kuulleet FF:sta kollegalta tai koulutustilaisuudessa, tai he olivat itse etsineet tietoa välineestä kuntoutuksen tueksi.

Tämän tutkimuksen tulokset viittaavat siihen, että eurooppalaiset puheterapeutit ovat valmiita kokeilemaan uudenlaisia kuntoutusmenetelmiä, vaikka niiden tehokkuudesta ei vielä ole tutkimusnäyttöä, ja joissain tapauksissa he myös ottavat ne käyttöön osaksi kuntoutustyötään. Tutkimuksen perusteella puheterapeutit vaikuttavat varsin rohkeasti ja ennakkoluulottomasti käyttävän FF:a erilaisten häiriöryhmien kanssa, vaikka systemaattista ohjeistusta ja tutkittua tietoa ei ole vielä saatavilla.

Avainsanat: FACEFORMER®; kyselytutkimus; orofakiaalinen myofunktionaalinen terapia; puheterapia

Tämän julkaisun alkuperäisyys on tarkastettu Turnitin OriginalityCheck –ohjelmalla.

PREFACE

This thesis is part of a larger study about orofacial myofunctional therapy and myofunctional training devices. We appreciate the time and effort of the speech and language therapists who responded to the survey.

Especially Saara Törmä has made a significant contribution to the work presented in this thesis. Thank you Saara!

18.1.2022

Johanna Virkki

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Appendix 1. The online survey (English version)

1 INTRODUCTION

Speech and language therapists around the world are using orofacial myofunctional therapy and/or myofunctional training devices in the rehabilitation of both their pediatric and adult clients (Shortland, Hewat, Vertigan & Webb, 2021). The goals of orofacial myofunctional therapy focus on enabling the proper use of the muscles needed when speaking, breathing, and swallowing, and the target is to correct and improve the function and postures of the muscles of the tongue, lips, soft palate, and pharynx (ASHA, n.d.; Kent, 2015; Shortland et al., 2021; Thomas & Kaipa, 2015). Exercises of orofacial myofunctional therapy include repetitive movements that can be enhanced by resistance (Kent, 2015; Moeller, Paskay & Gelb, 2014; Shortland et al., 2021; Thomas & Kaipa, 2015). Although there is some research evidence on the effectiveness of orofacial myofunctional therapy, little research has been done in the specific field of speech and language therapy, and the degree of evidence has been deemed weak in most studies (Shortland et al., 2021).

Despite the lack of research evidence, at least some speech and language therapists in Europe utilize orofacial myofunctional therapy or the training devices related to it in clinical work. FACEFORMER[®] (referred henceforth as FF) is one example of a myofunctional training device (FACEFORMER, n.d.). Since there is no research available about the use of the device, it is important to study for which client groups and in what ways FF has been used, and how speech and language therapists have ended up using FF. In this study, the experiences of European speech and language therapists on using a myofunctional training device, FF, in clinical work were investigated by an online survey.

2 OROFACIAL MYOFUNCTIONAL DISORDERS AND THERAPY

2.1 Orofacial myofunctional disorders

Orofacial myofunctional disorders, which are often evaluated by speech and language therapists, can be defined as conditions and/or actions that have an undesirable effect on a person's oral and face muscles (de Felício & Pimenta Ferreira, 2008; Mason, 2005). Orofacial myofunctional disorders are thus atypical movements and postures of the face and mouth muscles, which can be examined by a speech and language therapist who assesses the structures and the movements of the lips, cheeks, jaw, and tongue (ASHA, n.d.; Shortland et al., 2021).

Examples of orofacial myofunctional disorders include, for example, limited tongue movement, mouth breathing, overbite and underbite, swallowing difficulties, lip incompetence, difficulty in articulating specific sounds, and drooling (ASHA, n.d.; Mason, 2005). Orofacial myofunctional disorders can be caused by many different factors, which can be functional or structural—for example, by finger sucking, harmful chewing and biting habits (for example lips, fingers, tongue, and cheeks), too-long use of pacifiers, as well as open mouth position, malocclusion, and airway restrictions (ASHA, n.d.; Bigenzahn, Fischman & Mayrhofer-Kramme, 1992; Mason, 2005). Early identification and correction of unwanted actions and retraining by speech and language therapy are essential in treatment of orofacial myofunctional disorders (Bigenzahn et al., 1992; Moeller et al., 2014).

2.2 Orofacial myofunctional therapy

Orofacial myofunctional therapy is a non-speech rehabilitation method that shifted from its original field of dentistry to speech and language therapy (Farrell & Darcy, 2018; Kent, 2015; Shortland et al., 2021; Wishney, Darendeliler & Dalci, 2019). The treatment was developed especially by orthodontists from the early to mid-1900s (Farrell & Darcy, 2018; Shortland et al., 2021; Wishney et al., 2019), when they realized that improving muscle dysfunction could correct malocclusion.

Orofacial myofunctional therapy aims to create a stable oral environment where normal muscle movements and postures, and normal processes of orofacial function and dental growth are possible

(Hanson & Mason, 2003; Mason, 2005; Shortland et al., 2021). The goal is to strengthen and improve the mobility of the muscles needed when speaking, breathing, and swallowing, and to enable normal muscle actions (ASHA, n.d.; Kent, 2015; Thomas & Kaipa, 2015; Shortland et al., 2021). The treatment aims thus to correct and improve the function and postures of the muscles of the tongue, lips, soft palate, and pharynx (ASHA, n.d.; Kent, 2015; Thomas & Kaipa, 2015; Shortland et al., 2021). Exercises include repetitive movements that can be enhanced by resistance (Kent, 2015; Moeller et al., 2014; Shortland et al., 2021; Thomas & Kaipa, 2015). The number of repetitions, the intensity of training, and the duration of the training period seem to improve treatment outcomes (Moeller et al., 2014).

Speech and language therapists have used orofacial myofunctional therapy and devices related to the treatment approach in the rehabilitation of both pediatric and adult clients: According to research findings, speech and language therapists use such exercises, for example, with their clients with feeding problems (in children), speech intelligibility, difficulties in swallowing, drooling, speech sound disorders, and oral sensory issues (ASHA, n.d.; Kent, 2015; Ray, 2003; Thomas & Kaipa, 2015). However, very little research on orofacial myofunctional therapy has been done in the field of speech and language therapy (Shortland et al., 2021). Shortland and colleagues (2021) reported that research in the field of speech and language therapy is mostly limited to case reports on fewer than 10 participants, and the degree of evidence has been weak in most studies. Shortland and colleagues also reported inconsistency in action protocols regarding quantity and intensity of therapy, as well as variation in evaluation and outcome procedures used across the same intervention target areas. Yet, according to Shortland and colleagues, there is limited evidence available suggesting that orofacial myofunctional therapy and/or use of myofunctional training devices could improve orofacial function in the areas of breathing, swallowing, and mastication. The next chapter will discuss orofacial devices from individually customized palatal training devices to non-customized, soft, and flexible myofunctional training devices.

3. OROFACIAL DEVICES

3.1 Palatal training devices

Speech and language therapists are familiar with versatile oral devices. One example of common oral devices is palatal training devices (e.g., Haapanen, 2003; Koskimies Pahkala & Myllykangas, 2011; Toivanen, Raveikko, Qvanström, Myllykangas & Pahkala, 2013) that are designed for strengthening the muscles inside the mouth. Haapanen (2003) refers to the devices as oral motor activators and Toivanen and colleagues (2013) as palatal training appliances (also known as ORA-koje in Finnish). Palatal training devices have small pieces, such as beads or rings, that are used as guides to activate the movements of the tongue (Haapanen, 2003; Koskimies et al., 2011; Toivanen et al., 2013),

Research results from Haapanen (2003) show that using palatal training devices improved articulation of the participating children faster and more effectively than traditional speech and language therapy. Further studies on the effects of palatal training devices have since provided additional encouraging results (Koskimies et al., 2011; Toivanen et al., 2013), and palatal training devices have also been found to work well in combination with speech and language therapy. In a study by Toivanen and colleagues (2013), the use of palatal training devices was connected to clarified speech and improved tongue movements of the participating children. The treatment of the children with palatal training devices in the study by Koskimies and colleagues (2011) was also combined with speech and language therapy. According to the results of the study, articulation and the posture of the tongue improved in about half of the children in the study (Koskimies et al., 2011). Further, preliminary studies have indicated promising results related to the passive nightly usage of a palatal training device that activates the tongue tip of the user (Huang et al., 2018). This type of passive nightly training has been found to potentially advance breathing during sleep in children with obstructive sleep apnea (Huang et al., 2018). Speech and language therapists who are familiar with the use and promising research results of the palatal training devices are probably open to other types of oral devices as well.

3.2 Myofunctional training devices

3.2.1 Non-customized myofunctional training devices

In the 1980s, non-customized, soft, and flexible myofunctional training devices were introduced for orofacial myofunctional therapy (Shortland et al., 2021). These new devices were cost- and time-effective when compared to many other devices that required tailored designs and longer time to be used (Di Vecchio, Manzini, Candida & Gargari, 2019; Hägg & Tibbling, 2016; Shortland et al., 2021; Wishney et al., 2019). The use of such myofunctional training devices has been active, for example, in the areas of sleep-disordered breathing and swallowing challenges (Di Vecchio et al. 2019; Hägg & Tibbling, 2016; Hägg, Tibbling & Franzén, 2015; Hägglund, Hägg, Jäghagen, Larsson & Wester, 2020; Moeller et al., 2014; Shortland et al., 2021; Wishney et al., 2019).

As recent examples, so-called oral neuromuscular training devices IQoro[®] and Muppy[®] (e.g., Hägg & Tibbling, 2016; Hägg et al., 2015; Hägglund et al., 2020) have been developed by Swedish researchers and used to rehabilitate, for example, patients with dysphagia caused by a cerebrovascular accident, and esophageal dysphagia and reflux symptoms. The use of both devices is similar: the device is placed in the mouth between the lips and teeth, after which it is pulled straight away from the mouth for 5–10 seconds at a time (Hägg et al., 2015; Hägg & Tibbling, 2016; Hägglund et al., 2020). At the same time, the user resists the pulling motion by squeezing their lips together. Exercises should be done three times a day before eating (Hägg et al., 2015; Hägg & Tibbling, 2016; Hägglund et al., 2020). Thus, these devices are not used during nighttime.

IQoro[®] training has been found to improve muscle function in the lips, tongue, jaw, and palate (Hägg & Tibbling, 2016) and to relieve esophageal dysphagia and reflux symptoms in adult users, which, according to Hägg and colleagues (2015), happens most probably due to improved hiatal competence. Further, IQoro[®] training has been reported to be a promising approach for rehabilitation of swallowing difficulties in elderly people in intermediate care (Hägglund, Hägg, Wester & Levring Jäghagen, 2019).

A study of Muppy[®] training for rehabilitating swallowing of patients with dysphagia after a cerebrovascular accident (Hägglund et al., 2020) found no statistically significant differences in increased swallowing frequency, increased lip force, and decreased penetration-aspiration between the control group and the Muppy[®] -treated group at the end of the five-week rehabilitation period.

However, the positive effects of a five-week Muppy® training period on lip strength as well as increased swallowing frequency were observed in a 12-month follow-up assessment (Hägglund et al., 2020).

Further, a soft myofunctional training device called Froggy Mouth, which is also positioned between the lips and teeth, has achieved promising early results, providing a new approach for rehabilitation of atypical swallowing and dysfunctional deglutition in children (Di Vecchio et al., 2019). According to Di Vecchio and colleagues (2019), the Froggy Mouth should be used 15 minutes every day during a playful activity. According to the Froggymouth® (referred differently than in the publication by Di Vecchio and colleagues) website, the training device is a swallowing rehabilitation device from France that provides long-lasting correction to tongue posture as well as restores nasal breathing (Froggymouth, n.d.).

3.2.2 FACEFORMER

FF (Figure 1) is a training device specially developed for FACEFORMER therapy (FACEFORMER, n.d.). FF was developed in Germany by Klaus and Sabine Berndsen, who studied pathological linguistics and rehabilitation science (FACEFORMER, n.d.). According to the developers, the device strengthens the muscles of the face and the mouth area. The official training program consists of exercises in which the FF is placed between the teeth and lips (Figure 2) and is used actively during the day and passively at night (FACEFORMER, n.d.).



Figure 1. Myofunctional training device FF.



Figure 2. The user places the wide part of the FF between their lips and teeth. The same device can be used by children (left) and adults (right).

Active daytime exercises of the FACEFORMER therapy include, for example, pressing the lips against the device's wedge and pulling the FF by hand in different directions (Figure 3) while the user resists the pulling by squeezing their lips together. The idea of the nighttime passive use (i.e., without any active exercises), in turn, is that the device activates the mouth area for several hours. According to the developers' instructions, the first results can be noticeable after only a few days (FACEFORMER, n.d.). Through daily training, further development can be expected after approximately 6–10 weeks. The use of FF should in all cases be continued for six months to automate the desired muscle functions (FACEFORMER, n.d.).



Figure 3. The active exercises include pulling the FF by hand in different directions, while the user of the device resists the pulling by squeezing their lips together.

Although several publications on the use of the training device are listed on the FF developers' website (FACEFORMER, n.d.), none of them are published in international peer-reviewed scientific

journals or conferences. Instead, a literature search resulted in one scientific publication evaluating the effectiveness of FF training (Korbmacher, Schwan, Berndsen, Bull & Kahl-Nieke, 2004) and one article, which described a case study in which the effects of passive use of FF on tongue-jaw differentiation were evaluated (Virkki & Rantala, 2021).

The first publication investigated whether using the myofunctional training device, FF, enhanced lip closure and tongue lifting and thus improved swallowing (Korbmacher et al., 2004). The study by Korbmacher and colleagues (2004) involved 26 children aged 3 to 16 years who had been using FF for six months. The study also included a control group (19 children) receiving other types of orofacial myofunctional therapy. The study group showed statistically significant improvement in reverting from habitual mouth breathing to habitual nasal breathing after FF training. Both the study group and the control group showed improvement in lip strength and habitual mouth closure, but the FF training group managed to achieve the improvement more quickly than the control group (Korbmacher et al., 2004).

The goal of the second study (Virkki & Rantala, 2021) was to evaluate the effects of FF on tongue-jaw differentiation, especially on holding the tip of the tongue up to the alveolar ridge. In the study, the effects of FF on oral motor skills, especially tongue-jaw differentiation of a 7-year-old child with a cleft lip and palate, were followed for 12 weeks. In a weekly evaluation, the participant held the tip of the tongue up to the alveolar ridge for as long as he could (with the help of a piece of breakfast cereal). Further, he answered a weekly questionnaire about his feelings concerning the use of FF and the easiness of tongue tip elevation. These results were supported by an evaluation of the child's speech and language therapist, who evaluated tongue-jaw differentiation and especially tongue tip elevation during speech. According to the results of Virkki and Rantala (2021), the participant found the use of FF to be easy from the beginning, and there were no significant challenges during the study period. The time he was able to hold the tongue tip up to the alveolar ridge increased slowly during the first weeks, and after nine weeks the time doubled. Further, tongue tip elevation to the alveolar ridge during speech started to succeed without visual or tactile support of an adult. The participant himself also noticed the change in his oral motor skills and was happy with his results (Virkki & Rantala, 2021).

As presented, different orofacial myofunctional training devices (e.g., FF, Muppy[®], IQoro[®], Froggymouth[®]) have been developed in Europe. Even though the results of published studies seem promising, the amount of research evidence is still scarce, and the lack of research evidence on the

use of such devices in different areas of speech and language therapy is clear (Shortland et al., 2021). Still, in their clinical work, speech and language therapists may recommend orofacial myofunctional training devices to support rehabilitation. There is currently no information in the European area on how typical the use of such equipment is and for what disorders speech and language therapists recommend using orofacial myofunctional training devices.

4 RESEACH OBJECTIVES

Despite the lack of research evidence, at least some speech and language therapists in Europe utilize orofacial myofunctional therapy or the training devices related to it in clinical work. The aim of this study was to survey the experiences of European speech and language therapists in the use of one myofunctional training tool, FF, in clinical work. Before designing actual efficacy studies on the use of FF, it is important to know which clients appear to benefit from the use of FF, based on observations made in clinical work. It is thus important to first bring together the experiences of speech and language therapists—that is, the experts in the field—in the use of FF in clinical work. Thus, the goal in this study was to achieve a basic understanding of how and why the speech and language therapists have decided to implement FF as a part of rehabilitation. Further, the aim was to obtain information on where and how FF has been used and how speech and language therapists have ended up using FF.

Understanding the different ways of using FF in speech and language therapy can bring valuable information on how the use of FF should be researched in the future. The research questions were formed as follows:

1. With which client groups have speech and language therapists in Europe used FF, and how has FF been used in rehabilitation?
2. How have they ended up using FF with their clients?
3. How do they rate the usability of FF?

5 RESEARCH METHODS

5.1 Survey design

The research method chosen for this study was a survey, which has for decades been used in versatile research fields to gather responses from individuals and groups of people (Ponto, 2015). Surveys can be used to collect information about several different aspects of the subject in hand, such as attitudes and experiences, from both professionals and their clients (Story & Tait, 2019).

During the last decades, that is, in the internet era, online surveys have become a major research method in the academic world. This has happened because of their easy use as well as their time- and cost-effective nature, compared to more traditional surveys (Saleh & Bista, 2017). The questionnaire used in this study was designed based on the following guidelines of Saleh and Bista (2017):

- 1) The help of authority figures and organizations known to the target people, i.e., speech and language therapists, was used to distribute the survey.
- 2) The survey was made as brief but also as comprehensive as possible.
- 3) The potential respondents were informed beforehand of the approximate time it would take to complete the survey.
- 4) The number of open-ended survey items was kept at a minimum. (This was also done to prevent the responding speech and language therapists from providing any personal/health information of their clients.)
- 5) The respondents were informed about the data handling, access to data, storage of the data, and disposal of the data during and after the study.
- 6) The respondents were assured of the anonymity and confidentiality of the study responses. (The respondents will not be recognizable from the publications that will be written from the survey results.)
- 7) One reminder was sent to the places where the survey was advertised to motivate the potential respondents to complete the survey.
- 8) The constraints related to time-of-year for the speech and language therapists were considered. The survey was done well before the summer holiday time.

The survey was initially designed by two people (both logopedics students) while two other people (both speech and language therapists) commented on the survey afterwards. After the final draft of

the survey was done, two speech and language therapists from different countries field-tested the survey and gave their feedback, which was then used to further develop the survey to its final state. Both Finnish and English versions of the survey were written. The English translation was checked by a native speaker who was also a speech and language therapist.

5.2 Practical implementation of the survey

The survey was conducted using Tampere University's Microsoft Forms online questionnaire. The Finnish questionnaire for Finnish speech and language therapists was open from 9 March to 30 March 2021, while the English questionnaire for the rest of Europe was open from 25 March to 13 June 2021. The questionnaire was first shared on Facebook communities of different European countries followed by speech and language therapists. Next, the study description and link were sent by email to associations of speech and language therapists in Europe to forward to their members. The questionnaire link was also sent by email to speech and language therapists who advertised using FF on the internet as well as to the FF developers themselves to forward to their speech and language therapist contacts.

The questionnaire started with a short part that introduced the goals of the study. Further, the privacy notice of the research was attached to the introduction. The actual questionnaire first asked respondents about their background, which was followed by six questions about their use of FF. Five questions were multiple-choice: in four of the questions, the participants could choose multiple answer options, and in one question they could only choose one of the answer options. Only one question was an open-ended question. Each speech and language therapist who completed the survey responded to all the questions. The privacy notice of the research was again attached to the final part of the questionnaire, which was used to thank the respondents. Finally, each participant had to click "Accept!" and confirm that they understood that by submitting the form, they were granting permission for the given information to be used for research purposes in the way presented in the questionnaire. The questionnaire in English is attached as Appendix 1.

5.3 Participants of the survey

The survey was answered by 54 speech and language therapists from seven different European countries (Table 1). Most of the respondents (32) were from Finland, followed by Germany (10) and Austria (7). Respondents included speech and language therapists from less experienced (work experience < 5 years) to highly experienced (work experience > 30 years).

Table 1. The home countries and the work experience of the respondents.

Country	N (%)	Work experience (years)	N (%)
Austria	7 (13.0 %)	< 5	6 (11.1 %)
Finland	32 (59.3 %)	5–10	9 (16.7 %)
Germany	10 (18.5 %)	11–15	12 (22.2 %)
Hungary	2 (3.7 %)	16–20	13 (24.1 %)
Italy	1 (1.9 %)	21–25	5 (9.3 %)
Netherlands	1 (1.9 %)	26–30	5 (9.3 %)
Romania	1 (1.9 %)	> 30	4 (7.4 %)

The respondents were either self-employed (23 respondents; 42.6%) or worked in the private (18; 33.3%) or public (13; 24.1%) sector. The speech and language therapists who responded to the questionnaire had experience working with all client groups listed (Table 2). None of the 54 respondents had worked with all the listed client groups, and 16 respondents had worked with other client groups that were not listed in the questionnaire. Because the survey did not collect any health data from individual clients, these client groups remain unexplored in this study.

Table 2. The client groups that the respondents have worked with.

Client groups	N (%)
Articulation errors	51 (94.4 %)
Developmental language disorder	48 (88.9 %)
Childhood apraxia of speech	43 (79.6 %)
Speech disorder caused by cleft lip and/or cleft palate	23 (42.6 %)
Speech and/or language disorder caused by hearing impairment	20 (37.0 %)
Developmental disability	42 (77.8 %)
Cerebral palsy	26 (48.1 %)
Autism spectrum disorders	36 (66.7 %)
Speech and/or language disorder secondary to traumatic brain injury or brain tumor	26 (48.1 %)
Speech and/or voice disorder secondary to oral or laryngeal cancer	16 (29.6 %)
Speech and/or language disorder secondary to cerebrovascular accident	30 (55.6 %)
Speech and/or language disorder secondary to neurodegenerative disorder (e.g., Parkinson's disease, ALS)	23 (42.6 %)
Other	16 (29.6 %)

6 RESULTS

6.1 Familiarizing with FF

According to the responses to the questionnaire, speech and language therapists had received information about the FF training device from several different parties (Table 3). A total of 79 responses were issued, meaning that some of the respondents (N=54) had several sources of information on FF. More than half of the respondents (53.7%) had heard of FF at an educational event, such as a training or a seminar. Less than half of the respondents had either personally searched for information related to the topic and ended up trying FF (38.9%) or had a colleague tell them about the device (37.0%). In only four cases (7.4%) had the use of FF been recommended by the person who made the client's rehabilitation plan. In addition, one respondent (1.9%) stated that a client or a relative wanted the client to try using FF. Four respondents (7.4%) also offered another reason outside of the options given in the survey. Because the survey did not collect additional data from individual clients, these reasons remain unexplored in this study.

Table 3. Source of respondent's information about FF (N=54). Some respondents received information from several sources.

Source of information on FF	N (%)
The professionals who made my client's rehabilitation plan suggested the use of FF with my client.	4 (7.4 %)
A colleague told me about FF, so I decided to try it with my client.	20 (37.0 %)
I was looking for information myself, familiarized myself with FF, and decided to try it with my client.	21 (38.9 %)
I attended a training/seminar on the use of FF and decided to try it with my client.	29 (53.7 %)
My client or my client's relative wanted to try FF.	1 (1.9 %)
Other	4 (7.4 %)

6.2 Clients who have used FF

Speech and language therapists who responded to the questionnaire (N=54) gave a total of 145 responses regarding client groups that they had used FF with (Table 4). Thus, some therapists had

more than one client group that had used FF. Approximately half (51.9%) of respondents reported using FF with clients with articulation errors. A third (35.2%) of the respondents had used FF with clients with childhood apraxia of speech. In addition to these, developmental disability (29.6%) and cerebral palsy (24.1%) were often mentioned by the respondents. The respondents had used FF with all client groups mentioned in the questionnaire. Additionally, a third of the respondents (35.2%) had used FF with client groups not mentioned in this questionnaire. Because the survey did not collect health data from individual clients, these client groups remain unexplored in this study.

Table 4. Client groups with whom speech and language therapists (N=54) have used FF. Some respondents have used FF with several client groups.

Client group	N (%)
Articulation errors	28 (51.9 %)
Developmental language disorder	7 (13.0 %)
Childhood apraxia of speech	19 (35.2 %)
Speech disorder caused by cleft lip and/or cleft palate	8 (14.8 %)
Speech and/or language disorder caused by hearing impairment	2 (3.7 %)
Developmental disability	16 (29.6 %)
Cerebral palsy	13 (24.1 %)
Autism spectrum disorders	2 (3.7 %)
Speech and/or language disorder secondary to traumatic brain injury or brain tumor	9 (16.7 %)
Speech and/or voice disorder secondary to oral or laryngeal cancer	7 (13.0 %)
Speech and/or language disorder secondary to cerebrovascular accident	8 (14.8 %)
Speech and/or language disorder secondary to neurodegenerative disorder (e.g., Parkinson's disease, ALS)	7 (13.0 %)
Other	19 (35.2 %)

A total of 234 responses were given by the speech and language therapists (N=54) regarding different disorders and difficulties that they had rehabilitated with FF (Table 5), meaning that some respondents had done exercises with clients with different disorders (four different disorders on average). Most respondents (75.9%) had used FF to rehabilitate nonverbal oral motor skills, and almost as many (70.4%) had rehabilitated difficulties associated with breathing. Over half of the respondents (57.4%) mentioned that they had used FF to rehabilitate swallowing. Other disorders or difficulties that were

often rehabilitated with FF were multiple articulation errors (46.3%), teeth grinding (38.9%), single articulation errors (31.5%), snoring (31.5%) and dysarthric speech (27.8%). Additionally, eight respondents (14.8%) had used FF to rehabilitate disorders or difficulties not mentioned in this questionnaire. Because the survey did not collect health data from individual clients, these remain unexplored in this study.

Table 5. Disorders or difficulties rehabilitated by speech and language therapists (N=54) with FF. Some respondents had used FF to rehabilitate several different disorders or difficulties.

Disorder or difficulty	N (%)
Single articulation errors	17 (31.5 %)
Multiple articulation errors	25 (46.3 %)
Dysarthric speech	15 (27.8 %)
Apractic speech	6 (11.1 %)
Nonverbal oral motor skills	41 (75.9 %)
Breathing	38 (70.4 %)
Voice	5 (9.3 %)
Swallowing	31 (57.4 %)
Snoring	17 (31.5 %)
Sleep apnea	10 (18.5 %)
Teeth grinding	21 (38.9 %)
Other	8 (14.8 %)

6.3 Use and usability of FF

Speech and language therapists (N=54) gave a total of 101 responses on how they had instructed their clients to use the training device (Table 6). Some respondents chose several options in this question; that is, some speech and language therapists had differing instructions for different clients. Most respondents (72.2%) had prepared training instructions for the use of FF themselves, which the client then followed. Nearly half of the respondents prepared training instructions for the client and, in addition to that, instructed them to use FF during the nighttime (44.4%), and almost as many respondents (42.6%) had instructed their clients to follow the official FF training program created by

the developers of FF. Some respondents had advised their clients to use FF only during the nighttime and not do any active training (20.4%). Additionally, four respondents (7.4%) had instructed their clients to use FF in a way not mentioned in this questionnaire. Because the questionnaire avoided open-ended questions, to avoid collecting health data from individual clients, these instructions remain unexplored in this study.

Speech and language therapists had advised their clients to practice with FF for varying lengths of time. A total of 69 responses were given by the respondents (N=54), meaning they had advised different clients to use FF for different time periods. Most typically (23 responses; 33.3%), the training period lasted 6 months, which is also recommended by the FF developers. Some clients had been advised to use the device for shorter (19; 27.5%) or longer (10; 14.5%) periods of time. Nine responses (13.0%) included a time frame of the length of FF training. The time frames varied from using the device for three months to indefinitely (e.g., for clients with sleep apnea). Additionally, eight responses (11.6%) did not specify any length of treatment for various reasons (e.g., having used the device with too many clients to be able to answer). For all responses, it is noteworthy that we cannot rule out the possibility that an answer might have been given while rehabilitation was still in progress.

Table 6. Instructions on the use of FF given by the speech and language therapists (N=54). Some respondents have given several different instructions to their clients.

Training done by the client	N (%)
The client followed the FF training program.	23 (42.6 %)
The client did FF training based on the instructions given by the speech and language therapist but did not use FF during the nights.	39 (72.2 %)
The client used FF during the nights but did not do any active training.	11 (20.4 %)
The client did FF training based on the instructions given by the speech and language therapist and used FF during the nights.	24 (44.4 %)
Some other way	4 (7.4 %)

The majority of respondents (40 out of 54; 74.0%) felt that using FF was not difficult: they deemed FF to be either very easy (29.6%) or quite easy (44.4%) to use (Table 7). Four (7.4%) respondents found the use of FF to be quite difficult, but no one found FF to be very difficult to use. Eight (14.8%)

respondents felt that FF was neither difficult to use nor easy to use. Two (3.7%) respondents stated that they did not know if FF was easy or difficult to use.

Table 7. Respondents (N=54) opinion on the usability of FF.

Usability of FF	N (%)
Very difficult to use	0 (0.0 %)
Quite difficult to use	4 (7.4 %)
Not difficult or easy to use	8 (14.8 %)
Quite easy to use	24 (44.4 %)
Very easy to use	16 (29.6 %)
I do not know	2 (3.7 %)

7 DISCUSSION

7.1 Results of the study

The aim of this survey was to find out what kind of experiences European speech and language therapists have with the use of one orofacial myofunctional training device, FF, in clinical work: where they got information about the training device, with which client groups and how they had used the device, and what they thought about the usability of FF. Fifty-four speech and language therapists from seven different countries responded to the survey.

The respondents had received information about FF from several sources: most often from a training session or seminar, with other common sources of information being a colleague or the respondent's independent information searching. Speech and language therapists used FF to treat many different disorders, but the most typically treated disorders were challenges in nonverbal oral motor skills, articulation, breathing, or swallowing functions. Most of the respondents made training instructions for their clients themselves, and some recommended that the device should be used during the nighttime as well as the daytime. Respondents mostly found the use of FF to be quite easy or very easy.

The results showed that although there is not yet research evidence of the use of FF, and there is currently only limited research evidence on the effectiveness of orofacial myofunctional therapy and orofacial myofunctional training devices in general (Shortland et al., 2021), speech and language therapists do use FF with different client groups. It is important to note that even scarce evidence should be considered, especially in the absence of more comprehensive research; evidence-based practice is built on strong clinical expertise, the best available external/research evidence, and client's overall situation, as well as on information from the current practice setting (ASHA, n.d.; Hoffman Bennett & Del Mar, 2013; Sackett, Rosenberg, Gray, Haynes & Richardson, 1996). The results of this study suggest that speech and language therapists in Europe might at least be willing to try newer rehabilitation methods, even though there is no research evidence on their effectiveness yet, and in some cases also implement it as a part of their rehabilitation work. As described earlier, different orofacial myofunctional training devices (e.g., FF, Muppy[®], IQoro[®], Froggymouth[®]) have also been developed in Europe.

In the absence of scientific evidence, information for speech and language therapists about FF came from other trusted sources: colleagues and opportunities to gain new information chosen by the person, such as educational events. Additionally, four respondents had used the device because the person who made the client's rehabilitation plan suggested using FF. The diversity of data sources highlighted the notion that speech and language therapists might be interested in recommending and using FF even in the absence of research evidence.

In particular, the responses to the questionnaire highlighted four areas of speech and language therapy disorders in which FF was used: nonverbal oral motor skills, breathing, swallowing, and articulation errors. The training thus focused on training the muscle groups for which FF (FACEFORMER, n.d.) and orofacial myofunctional training in general were originally developed (ASHA, n.d.; Kent, 2015; Thomas & Kaipa, 2015). Speech and language therapists used the device the most with their clients who had difficulties in nonverbal oral motor skills. An earlier study suggests that squeezing the lips around a specific mouthpiece improves the function of the lips, tongue, chin, and palate muscles (Hägg & Tibbling, 2016), which supports the use of such devices in the rehabilitation of versatile oral motor skills.

Breathing difficulties were the second-most common group of disorders for which the use of FF had been directed by speech and language therapists. Mouth breathing is a commonly examined breathing problem (e.g., Pacheco, Casagrande, Teixeira, Finck & de Araújo, 2015). From a speech and language therapy perspective, the relationship between mouth breathing and tongue muscle strength is relevant: nasal-breathing children have stronger tongue muscles than mouth-breathing children (Azevedo, Lima, Furlan & Motta, 2018). In children with a developmental motor speech disorder, tongue strength has been found to be significantly lower than in typically developed children or in children with speech sound delay/disorder (Potter, Nievergelt & Vandam, 2019). Potter and colleagues (2019) concluded that the weaker tongue strength seems to be related to speech sound disorders that are of neurologic origin. Also, Hitos and colleagues (2013) concluded that mouth breathing may affect a child's speech development and socialization, which makes mouth breathing an important disorder for speech and language therapists to rehabilitate. According to the FF developers, the use of FF can strengthen nasal breathing and tongue muscles and therefore reduce mouth breathing (FACEFORMER, n.d.), but there is currently no published scientific research evidence available to support these claims.

Over half of the speech and language therapists who responded to the survey had used FF to rehabilitate their clients' swallowing. Rehabilitation of swallowing difficulties is also mentioned on the FF manufacturer's website as a possible use for the device (FACEFORMER, n.d.), although no published scientific evidence is available. The use of similar devices than FF (IQoro[®], Muppy[®], Froggymouth[®]) has been found to be effective in rehabilitation of swallowing (Di Vecchio et al., 2019; Hägg et al., 2015; Hägg & Tibbling, 2016; Hägglund et al., 2020), which supports the use of FF in rehabilitation of swallowing.

Typically, respondents had also used FF with clients whose speech was impaired by multiple articulation errors (46.3%) or single articulation errors (31.5%). There is conflicting information on the rehabilitation of articulation errors as to whether articulation can be rehabilitated through exercises that do not use verbal expressions, i.e., words (Kent, 2015; McCauley, Strand, Lof, Schooling & Frymark, 2009; Ruscello, 2010), and more well-designed research is needed about this topic. In a recent online survey by Rumbach and colleagues (2019), most of the participating Australian speech and language therapists responded not to use non-speech oral motor exercises with speech sound difficulties. In clinical work, however, oral motor exercises have sometimes been considered useful means of rehabilitating articulation errors when presented alongside other speech-related exercises (Muttiah, Georges & Brackenbury, 2011; Virkki & Rantala, 2021).

Approximately one-fourth of the respondents had advised their clients with dysarthria to use FF. Dysarthria causes difficulties in several aspects of speech production, such as breathing and articulation (Duffy, 2020); thus it seems understandable that speech and language therapists had tried using FF with dysarthric clients. When a similar study on non-speech oral motor exercises was conducted in Australia (Rumbach et al., 2019), dysarthria also came up frequently as a disorder that speech and language therapists rehabilitated with non-speech oral motor exercises. Similar results also previously came up in Scotland, Wales, and Northern Ireland (Mackenzie, Muir & Allen, 2010), where the respondents often rationalized using non-speech oral motor exercises based on clinical evidence from their own practices.

The speech and language therapists who responded to the survey had also instructed their clients to use FF because of snoring, teeth grinding, and sleep apnea. Although the treatment of these is mentioned on the FF developers' website (FACEFORMER, n.d.), there is currently no research evidence to support the rehabilitation. Snoring, teeth grinding, and sleep apnea do not traditionally belong to the field of speech and language therapy.

The responses to the survey showed that most of the speech and language therapists who responded prepared their own instructions on the use of FF. This is likely to indicate that the difficulties of speech and language therapists' clients are somewhat different from those for whom the device was originally developed. Although FF training instructions made by a speech and language therapist offer broader opportunities for rehabilitation planning for a specific client, a little under half of the respondents instructed their clients to follow the official FF training program. Speech and language therapists also sometimes advised their clients to use FF only at night.

Based on this study, most speech and language therapists have found the use of FF relatively easy. According to an earlier FF study of Virkki and Rantala (2021), the participant, who was a 7-year-old child, also found the use of FF to be easy from the beginning, and there were no significant challenges during the study period (12 weeks). Ease of use can help motivate the client to practice at home. On the other hand, if training is considered too difficult, the amount of training at home may be limited and therefore insufficient. FF also requires long-term use, and in this study, too, the most common duration of use for FF was six months. The FF manufacturer also recommends continuing the training for at least six months, even if positive results are observed after a shorter training period, to ensure that the new motion patterns and postures learned through the training are stabilized (FACEFORMER, n.d.).

7.2 Research methods of the study

Surveys can be used to collect information about several different aspects of the subject in hand, such as attitudes and experiences (Story & Tait, 2019). Survey as a research method is a useful and valid approach that has clear benefits, such as easy gathering of a large number of responses (Ponto, 2015; Story & Tait, 2019). The survey used in this study was answered by both less-experienced and highly experienced speech and language therapists. This shows that there is a use for such an orofacial myofunctional training device, even for those speech and language therapists who have already accumulated a wide range of skills and rehabilitation tools. In addition, the respondents included speech and language therapists working with various client groups; that is, the variety in the experience of the respondents was wide.

A total of 54 speech and language therapists from seven different countries responded to the survey. The questionnaire most likely did not reach all speech and language therapists who had used FF, and likely some speech and language therapists did not answer the questionnaire even though they had used FF with their clients. Over half of the respondents were from Finland. This does not necessarily indicate that FF is mostly used in Finland, as the large number of responses from Finland is most likely because the research team was from Finland. Distributing the survey was not as successful in other European countries as it was in Finland. It is also unclear if the survey was advertised in some countries at all, since not all of the associations and people that were contacted replied. Thus, the answers to the questionnaire may not fully reflect the European speech and language therapist community. To get more replies from each European country, a team with researchers from different countries would be needed. Despite the challenge of advertising the study, the survey received 22 responses from six European countries outside of Finland, and it can thus be considered to provide an international viewpoint on the topic.

7.3 Significance of the study and future work

This study did not provide any data on the effectiveness of FF rehabilitation. Researched information on the effects of using FF in different areas is needed. One reason for the low number of speech and language therapy efficacy studies is the individuality of humans: the causes and manifestations of different disorders in the field of speech and language therapy can be quite diverse (e.g., ASHA, n.d.; Duffy, 2020). It is difficult to organize a randomized and blinded research setup in smaller European countries like Finland, even in large cities and university hospitals. For this reason, data must be collected by other means, especially in a situation like this where the subject has not yet been properly studied.

From the point of view of clinical work, both the experience of professionals with their views on best practices and the clients' viewpoint are relevant. For this reason, it felt important to first bring together the experiences of speech and language therapists—that is, the experts in the field—in the use of FF in clinical work. Before designing the actual efficacy studies, it is important to know which clients appear to benefit from the use of FF based on observations made in clinical work. However, it would have been beneficial to also ask why the speech and language therapists preferred to use FF in the absence of research evidence. This piece of information would have added more value to the study results. Further, if use of other similar myofunctional training devices (e.g., Muppy[®], IQoro[®],

Froggymouth®) would have been studied as well, the study could have provided a more comprehensive viewpoint.

In the future, it would be important to study the use of FF several fields of speech and language therapy. For example, it seems important to study whether FF-training can change the breathing pattern of children from mouth breathing to nasal breathing and strengthen tongue muscles, which could further support other areas of speech and language rehabilitation. Presumably, FF, like similar orofacial myofunctional training devices (IQoro®, Muppy®, Froggymouth®), can also enhance swallowing, and the effect of FF training on rehabilitation of swallowing difficulties should be investigated. By combining these results with the results from earlier studies with similar myofunctional training devices (Di Vecchio et al., 2019; Hägg et al., 2015; Hägg & Tibbling, 2016; Hägglund et al., 2020), a more comprehensive understanding of the use of myofunctional training devices on rehabilitation of swallowing could be achieved.

Due to the limited speech and language therapy resources in several European countries, using FF as a supporting rehabilitation method for articulation errors seems like a viable option. Research evidence on the benefits of FF training from the viewpoint of articulation error rehabilitation is needed. These results would also be valuable for the ongoing discussion about whether articulation can be rehabilitated through exercises that do not use verbal expressions (e.g., Kent, 2015; McCauley et al., 2009; Ruscello, 2010).

Long-term speech and language therapy can be difficult for both clients and their loved ones. As of now, there is no research evidence on the effectiveness of the night use of FF. Studying this could be beneficial, as it could provide a good option for those clients who cannot do active training during the daytime, for example, due to a very busy schedule in their everyday life. Virkki & Rantala (2021) achieved promising results in their case study that reported the effects of nightly passive use of FF on tongue-jaw differentiation. Preliminary support to study this type of passive orofacial myofunctional therapy has also been achieved with a palatal training device, which was found to improve breathing during sleep in children with obstructive sleep apnea (Huang et al., 2018).

Most typically, the training period reported in this study lasted six months, which is also recommended by the FF developers. Further, several speech and language therapists reported even longer training periods. Staying motivated for such long training periods can be difficult, and training

might become exhausting, especially if there is no therapist to provide continuous support (Huang et al., 2018). It should therefore be examined whether decent and lasting results could be achieved with shorter FF training periods.

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Appendix 1. The online survey (English version)

In which EU country do you work in as a speech and language therapist?

Austria

Belgium

Bulgaria

Croatia

Republic of Cyprus

Czech Republic

Denmark

Estonia

Finland

France

Germany

Greece

Hungary

Ireland

Italy

Latvia

Lithuania

Luxembourg

Malta

the Netherlands

Poland

Portugal

Romania

Slovakia

Slovenia

Spain

Sweden

For how long have you worked as a speech and language therapist?

less than 5 years

6–10 years

11–15 years

16–20 years

21–25 years

26–30 years

over 30 years

Which sector do you work in as a speech and language therapist?

Public sector

Private sector

Third/voluntary sector

Self-employment

Select the types of clients you have worked with as a speech and language therapist.

Articulation errors

Developmental language disorder

Childhood apraxia of speech

Speech disorder caused by cleft lip and/or cleft palate

Speech and/or language disorder caused by hearing impairment

Developmental disability

Cerebral palsy

Autism spectrum disorders

Speech and/or language disorder secondary to traumatic brain injury or brain tumour

Speech and/or voice disorder secondary to oral or laryngeal cancer

Speech and/or language disorder secondary to cerebrovascular accident

Speech and/or language disorder secondary to neurodegenerative disorder (e.g., Parkinson's disease, ALS)

Other

Why did you decide to use FF with your client(s)? You can select multiple options.

The professionals, who made my client's rehabilitation plan, suggested the use of FF with my client.

A colleague told me about FF, so I decided to try it with my client.

I was looking for information myself, familiarized with FF, and decided to try it with my client.

I attended a training/seminar on the use of FF and decided to try it with my client.

My client or my client's relative wanted to try FF.

Other

Select the types of client(s) you have used FF with as a speech and language therapist.

Articulation errors

Developmental language disorder

Childhood apraxia of speech

Speech disorder secondary to cleft lip and/or cleft palate

Speech and/or language disorder caused by hearing impairment

Developmental disability

Cerebral palsy

Autism spectrum disorders

Speech and/or language disorder secondary to traumatic brain injury or brain tumour

Speech and/or voice disorder secondary to oral or laryngeal cancer

Speech and/or language disorder secondary to cerebrovascular accident

Speech and/or language disorder secondary to neurogenerative disorder (e.g., Parkinson's disease, ALS)

Other

Which area(s) have you rehabilitated with FF? You can select multiple options.

Single articulation errors

Multiple articulation errors

Dysarthric speech

Apractic speech

Nonverbal oral motor skills

Breathing

Voice

Swallowing

Snoring

Sleep apnea

Teeth grinding

Other

How have you supervised your client's use of FF? You can select several options in case different clients were supervised in a different way.

The client followed the FF training program.

The client did FF training based on the instructions given by a speech and language therapist but did not use FF during the nights.

The client used FF during the nights but did not do any actual training.

The client did FF training based on instructions given by a speech and language therapist and used FF during the nights.

Some other way.

How long has your client used FF? Give your answer for each client in months (e.g., 3 months, 6 months, 8 months). Please do not give any additional information about your client(s).

(open-ended question)

How would you rate the usability of FF?

Very difficult to use

Quite difficult to use

Not difficult or easy to use

Quite easy to use

Very easy to use

I don't know