

# Photobiomodulation with low-level laser therapy in the area of orofacial motricity: comparative analysis from the knowledge of specialists

## Fotobiomodulação com laser de baixa potência na área de motricidade orofacial: uma análise comparativa a partir do conhecimento dos especialistas

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### ABSTRACT

**Purpose:** To compare knowledge and interest of speech therapists specialized in Orofacial Motricity regarding the use of low-level laser before and after approval of resolution No. 541 by the Brazilian Federal Speech Language Pathology and Audiology Council (CFFa). **Methods:** Cross-sectional observational and quantitative study of comparative character consisting of two distinct moments: first data collection performed in 2016, before approval of the resolution; and second, collection performed in 2020, after publication of the regulation. The first sample consisted of 25 participants and the second of 49, with the entire sample consisting of specialists in Orofacial Motricity. The collection instrument was an online Google Form consisting of questions on the profile of the speech therapist, knowledge, interests, and applicability of photobiomodulation with low-level laser. Data were analyzed using descriptive and inferential statistics. **Results:** In both moments, the significant majority of professionals indicated knowing what is photobiomodulation, agreed that the Orofacial Motricity specialist can act with the technique and indicated temporomandibular dysfunction and facial paralysis as main applications. Statistically significant differences were found between the results obtained before and after the publication of the resolution, with a significant increase in access to bibliography, training, knowledge of biosafety standards, access to the low-level laser apparatus and use in clinical practice. **Conclusion:** Change in the professional profile regarding the use of photobiomodulation was verified, with increased knowledge, interest, and applicability by Orofacial Motricity specialists after publication of the normative resolution.

**Keywords:** Speech, language and hearing sciences; Speech therapy; Lasers; Laser therapy; Low-level light therapy

### RESUMO

**Objetivo:** comparar os conhecimentos e interesses dos fonoaudiólogos especialistas em motricidade orofacial quanto ao uso do laser de baixa potência antes e após a aprovação da Resolução nº 541 do Conselho Federal de Fonoaudiologia. **Métodos:** trata-se de um estudo observacional, transversal e quantitativo, de caráter comparativo. Foi composto por dois momentos distintos: uma primeira coleta de dados, realizada em 2016, antes da aprovação da resolução e a segunda coleta, realizada em 2020, após a publicação das normativas. A primeira amostra foi constituída por 25 participantes e a segunda por 49, todos especialistas em motricidade orofacial. O instrumento de coleta consistiu em um formulário *online* elaborado no Google Forms, composto por questões do perfil do fonoaudiólogo, conhecimentos, interesses e aplicabilidades da fotobiomodulação com o laser de baixa potência. Os dados foram analisados utilizando estatística descritiva e inferencial. **Resultados:** nos dois momentos, a expressiva maioria dos profissionais indicou saber o que é fotobiomodulação e concordou que o especialista em motricidade orofacial pode atuar com a técnica. Além disso, os profissionais apontaram a disfunção temporomandibular e a paralisia facial como principais casos para aplicações. Foram encontradas diferenças estatisticamente significativas entre os resultados obtidos antes e após a publicação da resolução, verificando-se aumento expressivo no acesso à bibliografia, capacitação, conhecimento das normas de biossegurança, acesso ao aparelho de laser e utilização na prática clínica. **Conclusão:** constatou-se mudança no perfil profissional em relação ao uso da fotobiomodulação, com aumento dos conhecimentos, interesses e aplicabilidades pelos especialistas em motricidade orofacial, após a publicação da resolução normativa.

**Keywords:** Fonoaudiologia; Fonoterapia; Lasers; Terapia a laser; Terapia com luz de baixa intensidade

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## INTRODUCTION

As the therapeutic properties of low-level laser (LLL) have been extensively studied for being an easy-to-use, non-invasive resource that has analgesic, anti-inflammatory, and regenerative action<sup>(1,2)</sup>. In the field of Speech Therapy, studies reveal that its effects have been quite positive when associated with conventional treatments, can be an important ally in the clinic of Orofacial Motricity – OM<sup>(3)</sup>.

OM corresponds to one of the areas of Speech Therapy science responsible for the study, evaluation, research, rehabilitation, and improvement of stomatognathic functions<sup>(4)</sup>. Clinical practice in the area is increasingly based on scientific evidence, which increases success in interventions. Thus, increase in scientific studies demonstrating the benefits of LLL therapy and its results within Speech Therapy is observed, with studies mainly focusing on temporomandibular dysfunction (TMD)<sup>(3,5,6)</sup>.

For showing several benefits, LLL has proved to be an important complementary resource in therapy, facilitating the patient's rehabilitation process and contributing to the adequacy of stomatognathic structures and functions. According to the properties presented by LLL, its action occurs through direct modifications in the cells, results of photophysical, photochemical, and photobiological effects<sup>(7)</sup>. These benefits are observed in the OM area, especially when combining LLL with conventional therapy, being a differential in the treatment of patients with temporomandibular disorders, facial paralysis, and pathologies that require tissue healing<sup>(6,8,9)</sup>.

The Brazilian Federal Speech Language Pathology and Audiology Council (CFFa) approved in March 2019, through resolution No. 541<sup>(10)</sup>, LLL therapy as a resource to be used by speech therapists in their clinical practice. Standards were prepared based on consultation and considering the opinion of the Brazilian Orofacial Motricity Association (ABRAMO) and the Department of Orofacial Motricity of the Brazilian Society of Speech and Hearing Therapy (SBFa). Given the provisions in the document, the professional becomes qualified to use this technology after training/specialization.

Before the approval of this resolution, a survey carried out with specialists in Orofacial Motricity indicated that most participants did not use LLL in their clinical practice and did not obtain knowledge on the subject in undergraduate and graduate studies, although agreeing that speech therapists should adopt this new technique in their procedures as a complementary resource to the treatment<sup>(11)</sup>. However, there are no studies on the knowledge of speech therapists who are specialists in OM after the publication of the resolution of CFFa, in 2019.

Therefore, considering that the recommendations could influence the professional practice in relation to the use of the resource and in order to identify possible changes resulting from the publication of official regulations in the profession, this study compares the knowledge and interests of Brazilian speech therapists specialized in OM regarding the use of LLL therapy before and after the approval of resolution No. 541 of CFFa.

## METHODS

The study is cross-sectional observational and quantitative of comparative character, consisting of two distinct moments: data collection performed in 2016, before approval of the CFFa resolution; and a second collection performed in 2020, after publication of the regulation.

The first sample consisted of 25 participants and the second of 49, with the entire sample consisting of specialists in orofacial motricity from all over Brazil, using convenience sampling, having as inclusion criteria being a professional graduated in the field of Speech Therapy and specialist in OM<sup>(11)</sup>.

The research was conducted through dissemination of an online questionnaire via social networks (*facebook* and *instagram*) and messaging application (*whatsapp*). During a four-week period, every Friday a folder of the research was shared along with the link that directed the volunteer to the *Google Forms* website, which contained the Informed Consent Form (ICF) and the study questionnaire.

All ethical criteria were considered and the study was previously submitted for evaluation and approval by the Institution's Human Research Ethics Committee for consideration and subsequent beginning of collection activities. The study was approved with the opinion number 4,103,029. All study volunteers had access to the ICF and agreed to participate.

The responses of the volunteers to the questionnaire, which contained questions on the profile of the speech therapist, training data, professional performance, and knowledge on photobiomodulation constituted the data of the first study, carried out in 2016, and of the present research. This questionnaire was adapted and consists of 34 questions, out of which 20 questions were replicated from the original study with the permission of the authors and 14 specific questions were inserted. However, only the questions present in the two studies were considered in this analysis.

The researchers had access to the database from the research previously carried out<sup>(11)</sup>, allowing for a comparative study. For data analysis, descriptive statistical analysis was performed from measures of absolute and relative frequency, as well as inferential statistics, using the Pearson's chi-square test and considering a significance level of 1%.

## RESULTS

The data for sample characterization are shown in table 01. Regarding the professional profile, some aspects diverged between the two different moments of collection. In the first moment, most participants were doctors and professors and in the second moment most participants were specialists. However, in the two samples of participants, the same mean age was found, the predominant period in the profession was 21 years or more, and the main workplace was the clinic. Sample characterization data are shown in Chart 1.

Regarding the knowledge on the resource, in both moments the expressive majority of participants indicated that they knew what photobiomodulation is, although they did not have content on the subject introduced in undergraduate or graduate studies.

**Chart 1.** Characterization of the participants, their knowledge and interests about photobiomodulation before and after the resolution of the Brazilian Federal Speech Language Pathology and Audiology Council

Variables	Before the resolution of CFFa	After the resolution of CFFa
Mean age	43.0	43.20
Background	Doctorate degree (61.5%)	Doctorate degree (28.6%)
	Master's degree (26.9%)	Master's degree (16.3%)
	Specialization (11.5%)	Specialization (36.7%)
	Up to 1 year (0%)	Up to 1 year (2.0%)
Professional activity	Between 1 and 5 years (0%)	Between 1 and 5 years (10.2%)
	Between 5 and 10 years (3.8%)	Between 5 and 10 years (4.1%)
	Between 10 and 20 years (42.3%)	Between 10 and 20 years (36.7%)
	From 21 years (53.8%)	From 21 years (46.9%)
Workplace	Clinic and/or internship (19.2%); classroom (11.5%); other locations (7.7%)	Clinic (75.5%); home care (32.7%); hospitals (22.4%), and classroom (20.4%)
	Teachers (81.5%)	Teachers (49.0%)
Teaching in Speech Therapy	Teaches in undergraduate courses (23.1%)	Teaches in undergraduate courses (8.2%)
	Teaches in postgraduate courses (30.8%)	Teaches in postgraduate courses (22.4%)
	Teaches in both courses (34.6%)	Teaches in both courses (18.4%)
Knows what is photobiomodulation	Yes (92.3%)	Yes (100%)
Content on photobiomodulation introduced at graduation	100% of professionals did not have	93.9% of professionals did not have
Content on photobiomodulation introduced at postgraduation	96.2% of professionals did not have	85.7% did not have
Access mode to LLL apparatus	Private apparatus (0%)	Private apparatus (63.3%)
	Universities (23.1%)	Universities (12.2%)
		Rental/lending (6.1%)
Agree that the specialist in OM should act in photobiomodulation	Yes (76.9%)	Yes (67.3%)
	No (3.8%)	No (2.04%)
	Does not know (19.2%)	Does not know (30.76%)
Therapeutic indications	TMD (46.2%)	TMD (28.57%)
	Facial paralysis (3.8%)	Facial paralysis (40%)
	Both (34.6%)	

**Subtitle:** CFFa = Brazilian Federal Speech Language Pathology and Audiology Council; LLL = Low-level laser; OM = Orofacial motricity; TMD = Temporomandibular dysfunction

**Table 1.** Associations between the knowledge and interests of specialists before and after the resolution of the Brazilian Federal Speech Language Pathology and Audiology Council

	Before the resolution of the CFFa			After the resolution of the CFFa			p value
	Response	N	%	Response	N	%	
Did some training/qualification in photobiomodulation	Yes	2	7.7%	Yes	41	83.7%	p=0.0001*
	No	24	92.3%	No	8	16.3%	
Access to some bibliography on photobiomodulation	Yes	10	38.5%	Yes	41	83.7%	p=0.0001*
	No	16	61.5%	No	8	16.3%	
Access to an LLL apparatus	Yes	5	19.2%	Yes	41	83.7%	p=0.0001*
	No	21	80.8%	No	8	16.3%	
Uses LLL therapy in clinical practice	Yes	1	3.8%	Yes	35	71.4%	p=0.0001*
	No	25	96.2%	No	14	28.6%	
Know the biosafety standards in photobiomodulation	Yes	6	23.1%	Yes	42	85.7%	p=0.0001*
	No	20	76.9%	No	7	14.3%	

Pearson's Chi-square test, p <0.01\*

**Subtitle:** CFFa = Brazilian Federal Speech Language Pathology and Audiology Council; LLL = Low-level laser; N = Number; % = Percentage;

There was a significantly higher number of participants in the second moment of collection, which may be related to the form of dissemination, as initially only email invitations were used and social networks later for dissemination. Knowledge and interests on photobiomodulation before and after the resolution of CFFa are shown in Chart 1.

Statistically significant differences (p <0.01) were verified between the results obtained before and after the resolution of the CFFa and it is possible to observe that currently more people have tried to be trained in photobiomodulation, have access to bibliography on LLL therapy, know the biosafety standards, have access to LLL apparatus, and use the resource in clinical practice (Table 1).

## DISCUSSION

Considering that the study was conducted in two distinct stages, before and after the establishment of standards for use of LLL therapy by speech therapists, the analysis of results provided a better understanding of the changes resulting from the publication of the resolution of the CFFa. Change in the professional profile regarding the use of photobiomodulation technique was observed.

The difference verified in the characteristics of the participants may result from the form of dissemination of the questionnaire. Initially, the questionnaire was sent only by email to specialists in OM, recruited through data made available by ABRAMO. In the second moment, the dissemination was broader, also using social networks as a strategy to reach a greater number of professionals from all regions of the country. An interesting aspect is that although in the first moment the professionals were predominantly doctors and professors; and in the second were predominantly specialists, there was an increase in information, interests, and access to the resource after the publication of the resolution of CFFa.

Training/qualification on photobiomodulation in Speech Therapy or health, as well as the access to some bibliography on photobiomodulation were some of the results that significantly increased between the two moments, revealing that the demand of professionals on the technique increased.

Such findings may be related to the increase in the number of publications in the area, as a result of new studies addressing photobiomodulation<sup>(6,12)</sup>, which may also be associated with increased availability of training courses in photobiomodulation. In addition, they may be related to the recent approval of the technique by the CFFa., which increased knowledge on the resource. This increase was verified through comparison between the two moments of collection of this study. After the resolution of the CFFa, there was an increase in the interest on the subject, which may be related to the mandatory qualification of professionals prior to having permission to use of the resource.

Although it is an apparatus that has a relatively high-cost, its access increased when comparing the two moments of the study, as initially the participants had the resource available only in universities and currently more than half of respondents have a private LLL. In addition, it can be observed by comparative analysis that the use of this resource in clinical practice in OM increased significantly. Thus, it is observed that the publication of the official regulations for the profession contributed to expand knowledge, appreciation, and the use of LLL therapy by speech therapists.

Currently, most respondents agreed that specialists in OM can work with the photobiomodulation technique. Such aspects may be related to the dissemination of studies and clinical evidence in the area, as they show satisfactory results in patients who need care involving the OM field. Thus, it is highlighted that OM is one of the areas of Speech Therapy that has more scientific support in the use of the technique<sup>(6,9,13)</sup>.

In the present study, the main clinical applications pointed out were observed for cases of facial paralysis and TMD, which is in accordance with discussions and scientific evidence in the area of OM<sup>(5,9,14)</sup>. Regarding facial paralysis, studies have shown positive results regarding the association of LLL with the use of conventional treatment, showing significant improvements for patients with idiopathic facial paralysis. In these cases, the

use of LLL therapy has advantages for reducing the treatment period, being more agile and efficient<sup>(9,12)</sup>.

The use of LLL therapy in TMD has been consolidated after clinical practices and research that showed its beneficial action, strengthening as scientific evidence. Findings demonstrated that LLL therapy acts to reduce pain caused by TMD for its analgesic and anti-inflammatory action, also increasing the range of mandibular movements when associated with other conventional therapeutic methods<sup>(5,6,8,15)</sup>.

Finally, another aspect to be highlighted is the access to the biosafety standards for using the resource, in the first moment of the study, it was verified that most of the respondents did not have access to standards for the use of LLL. On the other hand, the opposite trend was observed in the current moment, as most specialists are aware of these standards. This is a positive and highly relevant finding, considering that it is important for application of LLL therapy, which demands special attention from the therapist for the adequate use of personal protective<sup>(1)</sup>.

Thus, change in the profile of professionals specialized in OM after the publication of resolution No. 541 of the CFFa was observed, with increase in knowledge, interests, and clinical use involving the various applicabilities of LLL therapy. Considering the current context of evidence-based practice of speech therapy, advances with the expansion of scientific research on photobiomodulation in the field of OM was observed, increasing reliability in the use of the technique. In accordance with the regulations of the profession, the need for a minimum education/training from speech therapists to work with this resource is highlighted, considering the specificities and peculiarities involved to master the technique and the ethical commitment of professionals in search of offering the best interventions, in order to achieve satisfactory clinical results.

## CONCLUSION

The study identified that, after publication of the resolution of CFFa, there was expressive increase of professionals interested in photobiomodulation, seeking to learn and improve their knowledge in order to use the technique. Together with the advancement of research, that revealed the therapeutic potential of LLL therapy, the regulation increased the interest and confidence of professionals, resulting in increased demand, clinical use, and expansion of the access of speech therapists to the laser apparatus.

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