

# The Effect Of Proprioceptive Neuromuscular Facilitation (PNF) On Increasing Facial Muscle Strength In Patients With Bell's Palsy In Anugerah Sehat Physiotherapy Practice

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## ABSTRACT

A health disorder in the form of weakness in the peripheral nerve VII (N. facialis) is called bell's palsy which results in asymmetry in the right and left facial muscles, so that the face looks rotten or tilted. Bell's Palsy occurs due to exposure to cold air which causes inflammation of the facial nerve to experience edema and pinch the facial nerve which then causes compression and direct damage to the nerve. One of the intervention technologies that can be applied to Bell's Palsy cases is Proprioceptive Neuromuscular Facilitation (PNF). The purpose of the study was to determine the effect of Proprioceptive Neuromuscular Facilitation (PNF) on increasing facial muscle strength in patients with Bell's palsy in the practice of Anugerah Sehat Physiotherapy. The type of quantitative research, with the research design used is Quasi Experimental with a pre-test and post test one group approach. This research was carried out at the Anugerah Sehat Physiotherapy Practice in September 2022. The population in this study is 30 Bell's Palsy patients. The sampling technique in this research is Total Sampling. Bivariate analysis used the Paired Sample Test to see the effect of facial muscle strength of Bell's Palsy patients before and after Proprioceptive Neuromuscular Facilitation (PNF) treatment on the increase in facial muscle strength in Bell's Palsy patients. The results of the study before the Proprioceptive Neuromuscular Facilitation (PNF) modality were carried out that the value of the facial muscle strength of the respondents who experienced Bell's Palsy, respectively in the Ugly (<30) and medium (30-70) categories with a total of 15 people (50%), after the Proprioceptive Neuromuscular Facilitation (PNF) modality was carried out for 8x visits in 1 month, that the value of the facial muscle strength of the respondents who experienced Bell's Palsy experienced significant changes, namely in Normal category (70-100) as many as 30 people (100%). There was an effect of Proprioceptive Neuromuscular Facilitation (PNF) on the increase in facial muscle strength in patients with Bell's Palsy with a significant value of 0.000<0.05.

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## INTRODUCTION

Health is a perfect state both physically, mentally, and socially, not only free from disease or weakness/disability. Meanwhile, according to the Ministry of Health, Law No. 36 of 2009, health is a state of health, both physically, mentally, spiritually and socially that allows everyone to live socially and economically productive (WHO, 2015).

Having a face that looks healthy and well-groomed is the dream of every human being, in daily interactions often humans express various facial expressions about the feelings they feel. Facial expressions or mimics are the result of one or more combinations of facial muscle movements such as smiling, raising both eyebrows, frowning the forehead, and so on. Facial expressions are a form of non-verbal communication to the person who observes it and one of the important ways to convey social messages in human life, but if the facial muscles experience weakness or health problems, then a person who experiences it will have difficulty directing his facial expressions. A health disorder in the form of weakness in the peripheral nerve VII (n. Facialis) is called bell's palsy which

results in asymmetry in the right and left facial muscles, so that the face looks rotten or tilted (Bahrudin, 2011).

Bell's Palsy occurs due to exposure to cold air which causes inflammation of the facial nerve to experience edema and pinch the facial nerve which then causes compression and direct damage to the nerve, with acute onset affecting 20-30 people per 100,000 per year. The annual incidence of Bell's Palsy is 20 per 100,000 people regardless of gender or ethnicity. This incident does not take into account age but tends to be higher when over the age of 40. The risk factors for Bell's Palsy are diabetes, obesity, hypertension, severe preeclampsia and pregnancy (Patel, 2015).

According to (Cooper et al., 2017) The prevalence of Bell's Palsy in the world is quite high. Based on research data by El-Tallawy et al, (2016) the incidence rate of Bell's Palsy in the city of Al-Quseir, Egypt is 98.9/100,000 in residents aged 9 years and above. According to United Kingdom hospital statistics from the Health and Social Care Information Centre, hospital diagnoses of Bell's Palsy cases increased between 2011 and 2015 in the United Kingdom. The number of Bell's Palsy cases in 2011-2012 was 13,114, increased in 2012-2013 by 13,151 and in 2013-2014 by 14,001, then decreased in 2014-2015 to 13,463. From 2014 to 2016, the incidence rate of Bell's Palsy in India was 253 cases of Bell's Palsy patients at RA Hospital & Research Centre, Warisaliganj (Shankar et al., 2017). The prevalence of Bell's Palsy in the United Kingdom and the United States is 22.4 and 22.8 per 100,000 inhabitants per year, respectively. In the Netherlands (1987) 1 patient per 5000 adults and 1 patient per 20,000 children per year. (Abdul Qudus & Anjani Nurjanah, 2021).

Research data conducted by Hardika (2015) shows that prevalence data regarding Bell's Palsy cases is difficult to find. This is because the prevalence data on Bell's Palsy cases in Indonesia is not included in the Indonesia Health Profile and Basic Health Research by the Ministry of Health of the Republic of Indonesia, as well as the number of studies on the prevalence of Bell's Palsy is still small in Indonesia.

Bell's Palsy cases occur a lot in Indonesia. The prevalence of Bell's Palsy in Indonesia is 19.55%, this case can affect all ages from toddlers to the elderly. Usually it is about one side only (unilateral), bilateral and can be repeated (Hargiani, 2019). The prognosis of individuals with Bell's Palsy is generally very good. The degree of damage from the nerves also affects recovery. With or without treatment, most individuals begin to get better (more than 85%) within 2 weeks of the onset of initial symptoms and most recover some or all of the facial function. Some individuals may be left with mild residual weakness or exhibit moderate to severe side effects. In addition, having or not having comorbidities also affects the recovery from Bell's Palsy condition itself (Cai et al., 2017).

Problems that are often experienced by patients after realizing the weakness of the facial muscles, in terms of physiotherapy, including Impairment that often occurs in the condition of Bell's Palsy is the presence of asymmetry on the face, stiffness and thickness on the lesionized side of the face, a decrease in the strength of the facial muscles on the lesion side, the potential for spasm and tissue adhesion, and the potential for irritation in the lesion side of the eye.

Physiotherapy is a form of health service aimed at individuals or groups to develop, maintain and restore movement and body functions throughout the life span by using manual handling, improvement of movement, equipment (physical, electrotherapeutic and mechanical), functional training and communication (PERMENKES RI No. 65, 2015). Intervention technologies that can be applied to Bell's Palsy cases include Infra Red, Micro Wave Diathermy, Elerctrical Stimulation, Massage, Proprioceptive Neuromuscular Facilitation (PNF) and Mirror exercise. The intervention of choice used in this case of Bell's Palsy is Proprioceptive Neuromuscular Facilitation (PNF).

Proprioceptive Neuromuscular Facilitation (PNF) is a choice of methods that are formalized and facilitated for muscles in the form of stretching movements, movement restraint, traction and approximation in order to improve the decline in muscle function, atrophy and joint limitations (Namura et al., 2008).

Based on preliminary survey data conducted in the last 6 months (January 2022 - June 2022), the number of Bell's Palsy patients who come to the physiotherapy practice is 127 people with a ratio of 20 people per month. In the last 6 months, Bell's Palsy patients have the highest number of visits after stroke patients, and low back pain. Based on the above data, the researcher is interested in conducting a study at the research site with the title The Effect of Proprioceptive Neuromuscular Facilitation (PNF) on Increasing Facial Muscle Strength in Patients with Bell's Palsy in the Anugerah Sehat Physiotherapy Practice.

## METHOD

The type of research used is a quantitative type of research, with the research design used is Quasi Experimental with a pre-test and post test approach of one group, namely making a comparison before and after being given treatment with one group. The research was carried out in September 2022. The population in this study is 30 Bell's Palsy patients. The sampling technique in this research is Total Sampling, which uses all Bell's Palsy patients as a sample of respondents (Sugiyono, 2019). Bivariate data analysis was used to analyze the Paired Sample Test.

## RESULTS AND DISCUSSION

### Univariate Results

Based on the age of the respondents with Bell's Palsy, the majority of respondents aged 26-35 years (Early Adult) were 18 people (60%), followed by respondents aged 17-25 years as many as 9 people (30%) and 12-16 years old (Early Adolescence) as many as 3 people (10%). Based on the gender of Bell's Palsy patients, the majority of respondents were female as many as 23 people (76.7%), followed by male respondents as many as 7 people (23.3%).

**Table 1.** Frequency Distribution of Facial Muscle Strength Before Proprioceptive Neuromuscular Facilitation (PNF) Ugo Fish Scale

Data	H1		H2		H3		H4		H5		H6		H7		H8	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<b>Rest</b>																
Value 6	12	40	9	30	6	20	3	10	-	-	-	-	-	-	-	-
Value 8	9	30	12	40	12	40	6	20	-	-	-	-	-	-	-	-
Value 10	4	13,3	3	10	6	20	6	20	-	-	-	-	-	-	-	-
Value 12	-	-	-	-	-	-	3	10	-	-	-	-	-	-	-	-
Value 14	5	16,7	6	20	6	20	12	40	24	80	18	60	-	-	-	-
Value 16	--	-	-	-	-	-	-	-	-	-	-	-	3	10	3	10
Value 18	-	-	-	-	-	-	-	-	3	10	9	30	6	20	3	10
Value 20	-	-	-	-	-	-	-	-	3	10	3	10	21	70	24	80
<b>Frowning</b>																
Value 0	21	70	15	50	6	20	3	10	3	10	-	-	-	-	-	-
Value 3	9	30	15	50	21	70	18	60	18	60	12	40	9	30	6	20
Value 5	-	-	-	-	3	10	6	20	-	-	-	-	-	-	-	-
Value 6	-	-	-	-	-	-	3	10	3	10	3	10	-	-	-	-
Value 7	-	-	-	-	-	-	-	-	6	20	15	50	21	70	24	80
<b>Close Your</b>																
<b>Eyes</b>																
Value 9	30	100	30	100	30	100	9	30	6	20	2	6,6	-	-	-	-
Value 21	-	-	-	-	-	-	17	56,7	21	70	17	56,7	6	20	3	10
Value 30	-	-	-	-	-	-	4	13,3	3	10	11	36,7	24	80	27	90
<b>Smile</b>																
Value 9	30	100	30	100	30	100	9	30	6	20	2	6,6	-	-	-	-
Value 21	-	-	-	-	-	-	17	56,7	21	70	17	56,7	6	20	3	10

Value 30	-	-	-	-	-	-	4	13,3	3	10	11	36,7	24	80	27	90
<b>Whistle</b>																
Value 3	30	100	27	90	21	70	15	50	15	50	9	30	3	10	-	-
Value 7	-	-	3	10	9	30	15	50	15	50	21	70	27	90	30	100

Based on Table 1, the results were obtained that before Proprioceptive Neuromuscular Facilitation (PNF) was carried out in Bell's Palsy patients for 8x actions in 1 month, the value of facial muscle strength on the first day to the fourth day had not changed much, but on the fifth day the patient had experienced changes with an increase in facial muscle strength assessed by the ugo fish scale, namely when the sample was asked to rest, frowned, closed his eyes, smiled and whistled.

**Table 2.** Frequency Distribution of Facial Muscle Strength After Proprioceptive Neuromuscular Facilitation (PNF) Ugo Fish Scale

Data	H1		H2		H3		H4		H5		H6		H7		H8	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%	n	%
<b>Rest</b>																
Value 6	12	40	6	20	3	10	-	-	-	-	-	-	-	-	-	-
Value 8	9	30	12	40	6	20	6	20	-	-	-	-	-	-	-	-
Value 10	3	10	6	20	6	20	-	-	-	-	-	-	-	-	-	-
Value 12	-	-	-	-	3	10	-	-	-	-	-	-	-	-	-	-
Value 14	6	20	6	20	12	40	21	70	18	60	3	10	-	-	-	-
Value 16	--	-	-	-	-	-	-	-	-	-	-	-	3	10	-	-
Value 18	-	-	-	-	-	-	3	10	6	20	6	20	3	10	3	10
Value 20	-	-	-	-	-	-	3	10	6	20	21	70	24	80	27	90
<b>Frowning</b>																
Value 0	21	70	15	50	6	20	3	10	3	10	-	-	-	-	-	-
Value 3	9	30	15	50	21	70	18	60	18	60	12	40	9	30	6	20
Value 5	-	-	-	-	3	10	6	20	-	-	-	-	-	-	-	-
Value 6	-	-	-	-	-	-	3	10	3	10	3	10	-	-	-	-
Value 7	-	-	-	-	-	-	-	-	6	20	15	50	21	70	24	80
<b>Close Your Eyes</b>																
Value 9	30	100	30	100	30	100	9	30	6	20	2	6,6	-	-	-	-
Value 21	-	-	-	-	-	-	17	56,7	21	70	17	56,7	6	20	3	10
Value 30	-	-	-	-	-	-	4	13,3	3	10	11	36,7	24	80	27	90
<b>Smile</b>																
Value 9	30	100	30	100	30	100	9	30	6	20	2	6,6	-	-	-	-
Value 21	-	-	-	-	-	-	17	56,7	21	70	17	56,7	6	20	3	10
Value 30	-	-	-	-	-	-	4	13,3	3	10	11	36,7	24	80	27	90
<b>Whistle</b>																
Value 3	30	100	27	90	21	70	15	50	15	50	9	30	3	10	-	-
Value 7	-	-	3	10	9	30	15	50	15	50	21	70	27	90	30	100

Based on Table 2, the results were obtained that after Proprioceptive Neuromuscular Facilitation (PNF) was carried out on Bell's Palsy patients for 8x actions in 1 month, the value of facial muscle strength on the first day to the fourth day did not change much, but on the fifth day the patient had experienced changes with an increase in facial muscle strength assessed by the ugo fish scale, namely when the sample was asked to rest, frowned, closed his eyes, smiled and whistled.

Table 3. Assessment of Facial Muscle Strength Category Before Proprioceptive Neuromuscular Facilitation (PNF) Ugo Fish Scale

		Pre Test			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<30 (Ugly)	15	50,0	50,0	50,0
	30-70 (Moderate)	15	50,0	50,0	100,0
Total		30	100,0	100,0	

Based on Table 3, the results were obtained that before the Proprioceptive Neuromuscular Facilitation (PNF) modality was carried out, the value of the strength of the facial muscles of the respondents who experienced Bell's Palsy was in the Ugly (<30) and Moderate (30-70) categories, respectively, with a total of 15 people (50%).

Table 4. Assessment of Facial Muscle Strength Category After Proprioceptive Neuromuscular Facilitation (PNF) Ugo Fish Scale

		Post Test			
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	70-100 (Normal)	30	100,0	100,0	100,0

Based on Table 4, the results were obtained that after carrying out the Proprioceptive Neuromuscular Facilitation (PNF) modality for 8x visits in 1 month, the value of the facial muscle strength of respondents who experienced Bell's Palsy experienced significant changes, namely in the normal category (70-100) as many as 30 people (100%).

## Bivariate Results

Table 5. Paired Sample Test

		Paired Samples Test				
		Paired Differences		t	df	Sig. (2-tailed)
		Mean	Std. Deviation			
Pair 1	Before - After	-1,500	,527	-9,000	9	,000

Based on table 5 above, it can be concluded using the Paired Sample Test that after carrying out the Proprioceptive Neuromuscular Facilitation (PNF) modality for 8x visits in 1 month, a significant value of  $0.000 < 0.05$  was obtained, so it was concluded that there was an effect of Proprioceptive Neuromuscular Facilitation (PNF) on increasing the strength of facial muscles in patients with Bell's Palsy.

## Discussion

### Proprioceptive Neuromuscular Facilitation (PNF) on Increasing Facial Muscle Strength in Patients With Bell's Palsy

The use of electrical stimulation and proprioceptive neuromuscular facilitation modalities is actually good for the healing of Bell's palsy patients, but in its implementation it must be done continuously. The PNF technique can be described as a method of using volunteer movements to stimulate weak muscles. One of the motor controls that rests on the facilitation of the Proprioceptive Neuromuscular (PNF), the result depends on the correlation between the diagonal lines and the sagittal axis of the body. During the application of the PNF technique, rapid stretching is performed with light resistance movement through the muscles with gentle movements. The most important thing before performing the PNF technique method is to stimulate the facial muscles to increase the

strength of convolution. Three areas of the face should be focused when applying PNF in Bell's Palsy patients, namely the upper area (forehead and eyes), the middle area (nose), and the lower area (mouth) Barbara et al (2010).

The results of the research conducted by the researcher showed that in Bell's Palsy patients, PNF modality was carried out for 8x in 1 month so that in 1 week the sample was recommended for 2x diphysiotherapy. On the first to fourth day, the sample did not get much change, but at the fifth meeting, the sample already felt more changes such as enough rest time, can smile more, can whistle.

The results of the study found that the factors that cause Bell's Palsy in patients who come to physiotherapy are because they use a fan for too long, work under the air conditioner and some do not know the cause because they suddenly feel their mouth and face curved until the position of the face falls. After administering proprioceptive neuromuscular facilitation (PNF), an increase in muscle strength values was obtained on the face, as evidenced by examination and evaluation using the Ugo Fisch Scale on the facial muscles, After administering proprioceptive neuromuscular facilitation (PNF), an increase in functional ability was obtained in the facial muscles, as evidenced by examination and evaluation using the Ugo Fisch Scale, After 8 times of therapy using the proprioceptive modality neuromuscular facilitation (PNF) the patient's condition is much better, the left and right sides of the affected face are no longer thick, the patient can close his eyes and has no difficulty when eating and drinking, the patient already feels confident and no longer embarrassed when doing activities outside the home, the patient's face is more symmetrical both when resting and when moving.

Namura et al., (2008) PNF is effective in sharpening the mouth and submandibular area and may be useful for the perioral muscles to adapt to changes after orthodontic treatment because PNF improves facial function by initiating efforts through proprioceptive stimulation. Therefore, it can be recommended that PNF can be used as an adjective for electrical stimulation in improving facial symmetry and facial muscle function in people with Bell's palsy.

According to Barbara et al (2010), the PNF technique can be described as a method of using volunteer movements to stimulate weak muscles. One of the motor controls that relies on the facilitation of the Propioceptive Neuromuscular (PNF). The result depends on the correlation between the diagonal lines and the sagittal axis on the body. During the application of the PNF technique, rapid stretching is performed with light resistance movement through the muscles with gentle movements. The most important thing before performing the PNF technique method is to stimulate the facial muscles to increase the strength of convolution. Three areas of the face should be focused when applying PNF to Bell's Palsy patients, namely the upper area (forehead and eyes), the middle area (nose), and the lower area (mouth) (Shafshak, 2006).

## CONCLUSION

There was an effect of Proprioceptive Neuromuscular Facilitation (PNF) on the increase in facial muscle strength in patients with Bell's Palsy with a significant value of  $0.000 < 0.05$ .

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