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# MANAGEMENT OF PHYSIOTHERAPY IN CHILD WITH ATTENTION DEFICIT HYPERACTIVITY DISORDER (ADHD): A CASE STUDY

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### Abstract

**Introduction:** Attention-deficit hyperactivity disorder (ADHD) is a chronic condition that affects millions of children and often persists into adulthood. ADHD is one of the most common neurodevelopmental disorders with a worldwide prevalence rate of 5% among children and adolescents. The ratio of men to women is 2:1. The risk factors for ADHD include blood relatives with ADHD or other mental health disorders, exposure to a bad environment, the use of drugs, alcohol or smoking by the mother during pregnancy, maternal exposure to the toxic environment and also birth *prematurely*.

**Case Presentation:** The method used in this study is a *case report* from a patient at the Mitra Insan Mandiri (MIM) Clinic in Ponorogo with the identity of An. ANP aged 3 years 5 months.

**Management and Outcome:** Administration of neuro sensory (NS), head massage, expression massage, sensory integration and paravertebral release with myofascial release (MRF) technique showed a fairly good effect on the problems that exist in patients with ADHD.

**Discussion:** Giving *neuro sensory* used to download sensory stimulation and to train children to be quiet. Sensory integration (SI) therapy focuses on increasing the child's capacity to integrate sensory and input. SI therapy uses a neurophysiological approach to implementation and can reduce *hyperactivity* and attention problems. *Head massage* is useful for sensory stimulation, reducing children's emotions and providing a sense of comfort so as to make children calmer. *Massage expressions* may provide sensory stimulation to the face. *Paravertebral release* with the *Myofascial Release* (MFR) technique is given to reduce spasm in the paravertebral area.

**Conclusion:** The provision of therapy programs in the form of *neuro sensory*, sensory integration, *head massage*, *expression massage* and *paravertebral release* using the MFR technique can have a fairly good effect after 4 therapy sessions in dealing with problems caused by patients with ADHD.

**Keyword:** Attention-deficit hyperactivity disorder (ADHD), neuro sensory, sensory integration, head massage, expression massage, paravertebral release, myofascial release (MRF)



## Introduction

Attention-deficit hyperactivity disorder (ADHD) is a chronic condition that affects millions of children and often continues into adulthood. ADHD includes a combination of problems, such as difficulty sustaining attention, hyperactivity, and impulsive behavior. Another definition describes ADHD as a set of symptoms that manifest as an individual's inability to “plan the work and do the planning”, resulting from deficits in cognitive function<sup>1</sup>. In addition to the core symptoms of hyperactivity, impulsivity and inattention, children with ADHD show functional impairment in various areas of daily life such as planning homework, estimating the time it will take to complete tasks, staying focused on the task at hand and building and maintaining social relationships. who are with their friends. These problems have been shown to adversely affect the daily living functioning of children with ADHD as well as their academic performance in the long term<sup>2</sup>.

ADHD is one of the most common neurodevelopmental disorders with a worldwide prevalence rate of 5% among children and adolescents<sup>2</sup>. The prevalence of ADHD among children in America is about 5%, and 2, 5 % in adults. The ratio of men to women is 2:1. Girls show fewer disruptive symptoms, but more symptoms of inattention, as well as anxiety and depression. Meanwhile, boys show more disruptive behavior<sup>1</sup>. A systematic review of 102 studies covering 171 756 subjects found worldwide prevalence of ADHD is 5, 29 %. The age group of children found prevalence of 6, 5 %, and 2.7% for the group usi a teenager<sup>3</sup>.

The etiology of ADHD is not clearly known. Neurobiological factors are thought to be a strong enough factor for the onset of this disorder. Some of the risk factors that are suspected to be associated with or cause ADHD include blood relatives (such as parents or siblings) with ADHD or other mental health disorders, exposure to environmental toxins such as lead which is found mainly in paint and plumbing in old buildings, use of maternal drugs such as alcohol use or smoking during pregnancy, maternal exposure to environmental toxins such as *polychlorinated biphenyls* (PCBs) during pregnancy, and also premature birth<sup>4</sup>.

According to research conducted by<sup>5</sup>, physiotherapy modalities in the form of *Neuro Senso* can improve children's functional activities and reduce disturbances and obstacles in ADHD conditions. Sensory Integration (SI) therapy has a neurophysiological approach to behavior and can correct hyperactivity and attention problems. Therapy does not directly work on functional skills, but rather focuses on providing sensory input to help regulate the central nervous system. Through this sensory input, the underlying sensory processes are theoretically normalized with the assumption that an increase in sensory processing will lead to an observable increase at the functional level<sup>6</sup>. *Head massage* is given to stimulate sensory and reduce emotions in



children. Expression *massage* can help with sensory stimulation of the face. *Release* paravertebral using techniques *Myofascial Release* given to reduce spasm in the paravertebral region. *Myofascial Release* (MFR) is a soft tissue mobilization technique. MFR uses manual traction and prolonged stretching of fascia and muscles to break down adhesions, thereby helping to reduce pain, improve function, increase flexibility and thereby increase ROM<sup>7</sup>.

### Case Presentation

A patient An. ANP 3 years and 5 months old, female gender and religion of Islam. The patient's guardian complained that the child had not been able to sit quietly and quietly, liked to run around aimlessly, did not respond when called, and did not have eye contact and focus. Prenatal history was no problem during pregnancy, but the delivery time was delayed (*post date*) 7 days from HPL and premature rupture of membranes occurred. The patient was born spontaneously in the hospital, but did not cry immediately after birth. At the age of 2 months the patient had experienced fever and high fever. Based RIW ay at the growth, the age of 3 months the patient is able to raise his head, the age of 4 months can roll over the age of 8 months of being able to sit, and at 18 months was able to walk. However, the patient did not pass the crawling phase at the age of 6-9 months. The results of the anamnesis system showed paravertebral spasm, increased tone of the AGB, and hypersensitivity to the head and face.

Physical examinations are carried out starting from general examinations such as vital signs, to more specific examinations for the case. Physical examination is an important examination because it will help to establish a physiotherapy diagnosis.

Tabel 1. Vital sign.

Blood pressure	: 100/70 MmHg
Pulse	: 77 x/minute
Respiration	: 22x/minute
temperature	: 36.0°C
Height	: 60 cm
Weight	: 9 Kg

Vital sign examination is carried out to determine the general condition of the patient and to evaluate whether therapy can be carried out or not. Based on the vital sign examination table above, it shows that the general condition of the patient is good enough for therapeutic action.

IPPA examination (inspection, palpation, percussion and auscultation) is performed according to the needs or symptoms of the patient. For the patient in this case, only inspection and palpation were performed.



Inspection ;Static inspection: On static inspection, the patient's facial expression is less expressive and when standing, the patient's posture is stooped.

Dynamic inspection: On dynamic inspection, when walking, the patient tiptoes slightly. The patient also frequently *uses flapping hands* and when spoken to, the patient refuses to make eye contact .

Palpation. During palpation of the back area, there is spasm of the paravertebrae

Basic movement examination is done to determine the movement ability of the patient. Basic movement examination includes examination of active, passive and isometric movements against resistance. The following are the results of the patient's basic movement examination.

Tabel 2. Basic movement examination

Region		Active Motion	Passive Motion
AGA	Dextra	Full ROM	Full ROM
	Sinistra	Full ROM	Full ROM
AGB	Dextra	Full ROM	Full ROM
	Sinistra	Full ROM	Full ROM

Examination of the patient's basic movement abilities both passive and active for AGA and AGB all full ROM. While isometric movements were not performed in this patient.

Examination of basic capabilities, functional activity and sphere of activity carried out by using DDST. *The Denver Developmental Screening Test (DDST)* is an assessment method used to assess a child's developmental progress. This test is useful in identifying various problems early that affect growth and development in children. There are 4 sectors examined in the DDST, namely personal social, adaptive fine motor skills, language, and gross motor skills with various activities tested according to the age of the child.

Tabel 3. DDST examination

Sector	Activity	Results
<b>Social Personal</b>	Take food	F
	Brush your teeth without help	NO
	Play Snakes and Ladders (cards)	NO
	Dressing up without help	NO
<b>Fine motor adaptation</b>	Choose a longer line	P
	Drawing people 3 parts	F
	Imitate	F
<b>Language</b>	Knowing 2 opposite words	NO
	Knowing 3 adjectives	NO
	Meaning 5 words	NO
	Mention 4 colors	NO
	Understand 4 prepositions	NO
	All talk is understandable	F



	Knowing 4 activities	NO
	Know the use of 3 things	NO
<b>Rough motoric</b>	Walk heel to toe	NO
	Stand 1 foot 3 seconds	NO
	Stand 1 foot 4 seconds	NO
	Stand 1 foot 5 seconds	NO

The DDST examination above shows that the patient is able to perform activities of choosing a longer line in the adaptive fine motor sector. Some activities in the sectors tested in DDST still failed to be carried out by patients and most activities were not carried out because children did not have the opportunity to do trials because there were obstacles .

Sensory examination is carried out to find out if there is damage or abnormalities in the sensory system by providing stimulation to the child. This is because the sensory system plays an important role in the development and growth of children to be more optimal.

Tabel 4. Sensory examination

<b>Sensory System</b>	<b>Results</b>
Visual	reject
Audio	normal
Vestibular	reject
Olfactory	normal
Gustatory	normal
Tactile	reject
Proprioceptive	reject

The results of the sensory examination showed that there were several sensory systems that were impaired, namely visual, vestibular, tactile and proprioceptive. The existence of these problems can affect sensory perception and result in the patient's daily life activities .

Primitive reflex examination aims to detect neurological disorders or developmental disorders in children. Primitive reflexes that do not appear at the appropriate age , persist or reappear at an inappropriate age, and appear asymmetrically are signs of neurological and developmental disorders in children.

Tabel 5. Primitive reflex examination

Morro reflex	-	Integration
Gallant	+	Functional
ATNR	-	Integration
STNR	-	Integration



TLR	-	Integration
Root Reflex	-	Integration
Palmar Graps	-	Integration
Plantar Graps	+	Functional
Flexor Withdrawl	+	Functional
Babinsky	+	Functional
Landau	-	Integration
Blinking reflex	+	Functional
Stepping reflex	-	Integration
Protective reflex	-	Integration
Perez	-	Integration

Based on the results of the examination of primitive reflexes in the table above, it shows that there are still some primitive reflexes of the patient that have not been integrated.

Muscle examination is carried out to determine the ability and muscle strength of the patient. Examination of muscle strength was carried out using the XOTR method with the following results.

Tabel 6. Muscle examination

Region		Muscle Value
AGA	Dextra	X
	Sinistra	X
AGB	Dextra	X
	Sinistra	X
Neck		X
Trunk		X

Information

X = Normal muscle strength

O = No contraction

T = There is contraction no movement

R = reflex movement

The results of the examination of muscle strength using XOTR showed that the strength of the right and left AGA muscles, right and left AGB muscles, trunk and neck were normal.

*Abbreviated Conners Rating Scale* is a data collection tool for classifying, classifying, assessing a person or a symptom in the form of a list containing behavioral characteristics that are recorded in stages. The value obtained is more than 15 and the maximum score is 30.

Tabel 7. *Abbreviated Conners Rating Scale*  
( *Modified in Indonesian Language* )

No	Observed activities	0	1	2	3
1	Not tired / excessive activity				3
2	Easy to be happy, impulsive			2	
3	Annoying other kids		1		



4	Failure to complete activities that have been short started, attention span			2	
5	Constantly moving head or limbs				3
6	Lack of attention, easily distracted				3
7	His request must be fulfilled immediately, it is easy to become frustrated			2	
8	Often and easy to cry				3
9	His mood changes quickly and drastically				3
10	Explode irritation, explosive and unpredictable behavior				3
Amount			1	6	18
Total		25			

- If the measurement results get a score above 15 then it leads to ADHD
- Value 0 : if the condition is not found in children
- Value 1: if the situation is sometimes
- Score 2: if the condition is often found in children
- Value 3: if this condition always exists in the child

In the table above shows the results of the questionnaire *Abbreviated Rating Conners Scale* in patients and obtained a score of 25, which means that lead to ADHD.

### Management and Outcome

The physiotherapy program given to the patient during therapy is adjusted to the complaints experienced by the patient. Physiotherapists plan therapy programs that aim to train sensory, attention, vestibular, reduce hypersensitivity, reduce tone and spasm so that children become calmer and focus on the task. Courses of therapy given that *neuro senso* , sensory integration, *head massage* , *mass age* expression and *release* paravertebral with the following details.

Tabel 8. Physiotherapy Programe

Intervention	Aim
Neuro sensory	For sensory stimulation and train children to be calmer
Sensory integration - Proprioceptive stimulation - Vestibular stimulation - Blocking visuals	To stimulate crawling movements proprioceptive stimulation to train attention and coordination, increase vestibular sensory, synchronize audio and visual by reducing external stimuli .
<i>Head massage</i>	Sensory stimulation and reduce emotions in children
<i>Expression massage</i>	Sensory stimulation of the face
<i>Paravertebral release</i>	To reduce spasm in the paravertebral area

Results from therapy. The problems experienced by patients are tactile hypersensitivity,



some primitive reflexes are not yet integrated, sensory (vestibular, visual, and proprioceptive) are still lacking, there is an increase in AGB tone and paravertebral spasm. In addition, the patient has not been able to sit quietly, has not been able to focus and lack eye contact, and is hyperactive. Then the physiotherapist gave a therapy program that had been carried out for 4 sessions.

Evaluation of the sensory system is done by stimulating the sensory system. From the results of the examination after 4 therapy sessions, it was found that there was no change or improvement in the patient's sensory system.

Tabel 9. Evaluation of the sensory system

Sensory System	T0-T1	T4
	Results	
Visual	reject	reject
Audio	normal	normal
Vestibular	reject	reject
Olfactory	normal	normal
Gustatory	normal	normal
Tactile	reject	reject
Proprioceptive	reject	reject

Tabel 10. The results of the evaluation of primitive reflexes can be seen in the table below:

Reflex	T0-T1		T4	
	Results	Information	Results	Information
Morro reflex	-	Integration	-	Integration
Gallant	+	Functional	+	Functional
ATNR	-	Integration	-	Integration
STNR	-	Integration	-	Integration
TLR	-	Integration	-	Integration
Root Reflex	-	Integration	-	Integration
Palmar Graps	-	Integration	-	Integration
Plantar Graps	+	Functional	+	Functional
Flexor Withdrawl	+	Functional	+	Functional
Babinsky	+	Functional	+	Functional
Landau	-	Integration	-	Integration
Blinking reflex	+	Functional	+	Functional
Stepping reflex	-	Integration	-	Integration
Protective reflex	-	Integration	-	Integration
Perez	-	Integration	-	Integration

From the table above, it shows that after 4 times the therapy program there has been no





change in the results of the patient's primitive reflexes, there are still some that have not been integrated.

The next evaluation is the activity that is observed using the *Abbreviated Conners Rating Scale* which has been modified in Indonesian. Evaluation was carried out after 4 sessions of patient therapy.

Tabel 11. Evaluation *Abbreviated Conners Rating Scale*  
( Modified in Indonesian Language )

No	Observed activities	0	1	2	3
1	Not tired / excessive activity				3
2	Easy to be happy, impulsive		1		
3	Annoying other kids	0			
4	Failure to complete activities that have been short started, attention span			2	
5	Constantly moving head or limbs			2	
6	Lack of attention, easily distracted			2	
7	His request must be fulfilled immediately, it is easy to become frustrated			2	
8	Often and easy to cry				3
9	His mood changes quickly and drastically				3
10	Explode irritation, explosive and unpredictable behavior				3
Amount			2	8	12
Total 22					

From the results of the evaluation questionnaire above can be seen there is a change in the behavior of patients in the points 2, 3.5 and 6. Score penilainnya activity was observed in the questionnaire decreased after the therapy program as much as 4 times, will however still lead to the ADHD condition.

Hasi final evaluation after therapy program seba a multitude of 4 times the results obtained ma hell are hypersensitive to the face and head, the patient is still easily distracted, has been able to slightly tena n g, have not been able to communicate two-way, and spasm in the paravertebral decreased.

## Discussion

Therapeutic programs given to overcome complaints in patients are *Neuro Senso*, Sensory



Integration (SI), *head massage*, *expression massage*, and paravertebral release using the *Myofascial Release* (MFR) technique. *Neuro senso* is used for sensory stimulation and trains children to be calmer. *Neuro senso* is one method that aims to alleviate and eliminate stress and compensation dysfunctional and non-productive in the structure of the body, activate the motor programs are natural and genetic also the entire metabolism e p Indonesia Economic motion, activate (*brain-body*) integration mechanisms that affect the development of the motion, optimizing motor and sensor motors integration, menghilangkan stress at the time of learning, mendukung motor skills and cognitive natural and special, revealing the ability to make positive changes in structure, posture and gestures, and the system k-system koordinasi are diverse<sup>5</sup>. *Neuro Senso's* relationship with sensory disturbances is to reduce behavioral disorders such as overactive children who can't stay still, high emotions, concentration problems, oral motor disorders (swallowing chewing disorders or speech disorders), night sleep disorders and learning disorders. The method found in *Neuro Senso* can reduce sensory disturbances in ADHD children with a stroke technique from the head all over the body to relax tense muscles, a figure 8 stroke from the waist to the thigh as well as from the chest to the arm, this is a form of stimulation to train coordination of body movements<sup>8</sup>.

Sensory integration (SI) therapy focuses on increasing the child's capacity to integrate sensory and input. SI therapy uses a neurofisiologik approach to calibration pan and reduce *hyperactivity* and attention problems. The SI treatment procedure helps in controlling the sensory input which is integrated at the brain level which results in increased output of movement. SI therapy also facilitates the functioning of other brain areas including learning, coordination, speech, language reception and expression and behavior. The SI therapy provided includes tactile, vestibular, proprioceptive and *visual blocking* stimulation, carried out for 1 hour in the therapy session<sup>6</sup>.

*Head massage* is useful for sensory stimulation, reducing children's emotions and providing a sense of comfort so that children are calmer. Meanwhile, *expression massage* can provide sensory stimulation to the face. Paravertebral *release* with the *Myofascial Release* (MFR) technique is given to reduce spasm in the paravertebral area. MFR results in changes in the viscosity of the underlying muscle and fascia substance that can restore proper alignment of muscle fibers and increase joint mobility. MFR makes the fascia elongated, softened and more pliable thereby helping to restore the normal length of the fascia. The resulting muscle relaxation can promote the return of excess blood and oxygen, thereby increasing the pain threshold, which in turn promotes healing, reducing pain and pressure on fibrous connective tissue or fascia by breaking down adhesions<sup>9</sup>.



## Conclusion

*Attention-deficit hyperactivity disorder (ADHD)* is a chronic condition that includes a combination of problems, such as difficulty maintaining attention, hyperactivity, and impulsive behavior due to cognitive function deficits that affect functional abilities in various areas of daily life. Provision of treatment programs in the form of *neuro senso*, sensory integration, *head massage*, *massage* expression and *relea s e* paravertebral using MFR technique can give a pretty good effect after 4 times during a therapy session in addressing problems a n induced in patients with ADHD.

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