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# Coaching clinic contract relax and hold relax exercise optimising range of motion in sports injuries

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**ABSTRACT**

This community service programme aims to implement Contract Relax and Hold Relax technique training clinics to optimise Range of Motion (ROM) in Papuan athletes who have suffered sports injuries. It uses an Assets-Based Community Development (ABCD) approach through presentations and training clinics. The study involved Papuan athletes as participants, with a majority of males (62.5 percent) and a dominant age group of 15-16 years (47.9 percent). According to the injury history, 41.7 percent of participants reported experiencing injuries 2-3 times in the past year. The results showed a significant increase in athletes' understanding of rehabilitation techniques. The highest growth occurred in the knowledge of the Contract Relax principle (87.44 percent) and its application to injuries (85.68 percent). In practical skills, the greatest improvement was in mastery of the Contract phase (95.7 percent), followed by the Hold technique (95.0 percent). The implementation of techniques in injury cases showed optimal results for lower back pain with a 56.0 percent increase in ROM, followed by ankle sprains (45.1 percent). Participant satisfaction evaluations showed the highest ratings for instructor competence (4.89/5) and quality of practical application (4.70/5). This programme has proven effective in enhancing the knowledge, skills, and ROM of Papuan athletes with sports injuries through the Contract Relax and Hold Relax coaching clinic.

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## 1. INTRODUCTION

Sport is an integral part of Papuan life, not only as a physical activity but also as a pathway for achievement, cultural identity, and socio-economic development (Ita, 2017). Papuan athletes have shown extraordinary potential in various sports at the national and international levels (Guntoro et al., 2020). However, limited access to comprehensive sports health services, particularly in injury management and rehabilitation, poses a serious challenge to the sustainability of Papuan athletes' performance (Ita et al., 2024).

A sports injury is a form of injury that occurs during training, during the main competition, or post-competition (Harmianto et al., 2024; Kardi et al., 2024). The incidence of sports injuries increases with age, especially in athletes who regularly undertake strenuous training programs (Puspitasari, 2019). Sports

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are like a double-edged knife, which, if the dosage is not correct, can be fatal to athletes, one of which is injury and even death. Injuries can occur intentionally or unintentionally, with several contributing factors. The causes of injury can be divided into two factors, including internal factors caused by improper training methods, non-optimal warm-up and cooling, and lack of muscle stretching, resulting in pain 24-28 hours after training. External factors are caused by equipment installation, equipment conditions, equipment, unsafe training environment for activities from the characteristics of the sport itself (Harmon et al., 2019). Sports injuries are a hindering factor for every athlete in achieving peak performance (Kusuma et al., 2022). Sports injuries are not only acute injuries that occur during sports, such as strains, sprains, or fractures of the musculoskeletal system tissues, but also include overuse syndrome, which is a long-term (chronic) result of training sessions with monotonous and repetitive movements or postures (Setyaningrum, 2019).

Sports injuries are a common consequence of intensive physical activity, often experienced by athletes. One of the significant impacts of sports injuries is decreased range of motion (ROM), which in turn limits the athlete's performance and prolongs the recovery period (Tobing, 2019). Therapeutic techniques such as the Contract Relax and Hold Relax Exercise, which is part of the Proprioceptive Neuromuscular Facilitation (PNF) method, are effective in optimizing ROM in sports injuries (Hindle et al., 2012).

Data from the Ministry of Youth and Sports (2023) shows that the rate of sports injuries in Papuan athletes is 27 percent higher than the national average, with recurrence rates reaching 35 percent (Kementerian Pemuda dan Olahraga Republik Indonesia, 2023). This indicates an urgent need for an effective and sustainable rehabilitation program. Papua Province has challenging geographical characteristics with a wide population distribution and uneven infrastructure. These conditions create disparities in access to quality sports health services (Tambaip & Tjilen, 2023). Despite having great athletic potential, Papua faces limitations in terms of: 1) Sports health professionals trained in modern rehabilitation techniques; 1) Adequate sports rehabilitation facilities; 3) Knowledge and awareness of effective injury management; and a post-injury continuous athlete mentoring system. Based on this, it is necessary to apply effective and efficient methods for athletes.

The Contract Relax and Hold Relax Exercise methods are therapeutic techniques based on neurophysiological principles to increase flexibility and ROM through a combination of isometric contraction and muscle relaxation (Adler et al., 2014). These techniques have several advantages: Clinical Effectiveness: Studies show an increase in ROM by 15-30 percent after regular application of PNF techniques (Hindle et al., 2012). The Contract Relax and Hold Relax Exercise techniques can be taught and implemented with minimal equipment, making them particularly relevant for resource-constrained areas (Aziz et al., 2023). Regular implementation of Contract Relax and Hold Relax Exercise techniques can reduce the risk of recurrent injury by up to 40 percent (Page, 2014). Contract Relax and Hold Relax Exercise techniques can be taught through a cascade model, where trainees can become trainers for others, creating a sustainable impact (Marek et al., 2005). Athletes who received injury rehabilitation with appropriate PNF techniques experienced improved post-injury performance compared to those who only received conventional rehabilitation (Lima et al., 2019).

Based on the above context, community service in the form of a Coaching Clinic Contract Relax and Hold Relax Exercise for Papuan athletes is very important for the following reasons: 1) Transfer of Knowledge and Skills, the coaching clinic will facilitate the transfer of knowledge and practical skills from experts to local coaches, accompanying medical personnel, and athletes. This knowledge includes basic biomechanics of sports injuries, including principles of Contract Relax and Hold Relax Exercise, application techniques in various injury conditions, and a measurable and structured rehabilitation protocol; 2) Empowerment of Local Workers, this community service program will empower local athletes and coaches in Papua to become facilitators of athlete rehabilitation. Thus, dependence on experts from outside Papua can be reduced, and program sustainability can be improved; 3) Improved Athlete Performance, thus. This community service program has the potential to significantly improve the competitiveness of Papuan athletes.

The main targets and expected impacts of this community service program are sports team coaches in Papua, team medical assistants, and athletes from various sports. The expected impacts of this program include increased knowledge and skills in sports injury management, reduction in athlete injury recovery time, increased ROM in athletes with a history of injury, reduction in injury recurrence rates, and the formation of a sports rehabilitation support network in Papua. The solution framework is presented in Figure 1.


**Figure 1.** ROM troubleshooting solution framework

The objectives of this community service program are to provide a comprehensive understanding of the principles and applications of Contract Relax and Hold Relax Exercise techniques in sports injury management, to enhance athletes' skills in applying these techniques to optimize their range of motion (ROM) after injury, to empower athletes to perform self-management of injuries using the learned techniques, and to assess the effectiveness of applying Contract Relax and Hold Relax Exercise techniques among Papuan athletes.

## 2. METHODS

Asset-Based Community Development Approach (ABCD) (Rusli et al., 2024) used in the Contract Relax and Hold Relax Exercise Coaching Clinic for Papuan athletes offers a sustainable and contextualized model of empowerment. By focusing on the identification and mobilization of local assets, this community service program not only aims to optimize the Range of Motion (ROM) in sports injuries but also builds the capacity of the athlete community to manage their own health and injury recovery. The implementation of community service consists of socialization/education and demonstration/practice.

Partners in this service are athletes of the Papua Province Student Education and Training Centre, consisting of 11 sports with a total of 80 athletes, undergoing training camps in Doyo Baru, Jayapura Regency. The sample used in the service totaled 48 athletes who experienced problems in the scope of motion of the joints, with details of athletics: 10 people, football: 12 people, volleyball: 8 people, basketball: 8 people, martial arts: 6 people, and swimming: 4 people. The stages of Coaching Clinic Contract Relax and Hold Relax Exercise for Papuan athletes consist of three stages of activity in Table 1.

**Table 1.** Stage of coaching clinic contract relax and hold relax exercise for Papuan athletes

| Phases | Activities |
|---|---|
| **Preparation Phase** | |
| Preparation Phase | Conduct surveys and interviews with coaches, health workers, and athletes in Papua |
| | Identifying the types of injuries that often occur and the treatment methods commonly used. |
| | Analysing the availability of supporting facilities and infrastructure |
| Material Preparation | Develop a comprehensive yet easy-to-understand training module |
| | Prepare visual materials and video tutorials |
| | Design injury management protocols customized to local conditions |
| Coordination and Licensing | Collaborate with the Papua Provincial Sports Office |
| | Coordinate with DISORDA Papua and relevant sports organizations. |
| | Arrange for necessary licenses and administration |

| | |
|---|---|
| | **Pre-Test** |
| **Coaching Clinic Implementation Phase** | **Session 1: Anatomy and Biomechanics Basics**<br>- Functional anatomy of the musculoskeletal system<br>- Basic biomechanics of human movement<br>- Pathophysiology of sports injuries<br><br>**Session 2: Contract Relax Technique**<br>- Principles and mechanisms of action<br>- Indications and contraindications<br>- Step-by-step procedure<br>- Evidence-based practice<br><br>**Session 3: Hold Relax Technique**<br>- Principles and mechanisms of action<br>- Indications and contraindications<br>- Step-by-step procedure<br>- Evidence-based practice<br><br>**Session 4: CR and HR Applications in the Upper Extremities**<br>- Techniques for the shoulder, elbow, and wrist joints<br>- Common cases: impingement syndrome, tennis elbow, etc.<br>- Hands-on practice with athletes<br><br>**Session 5: CR and HR Applications in the Lower Extremities**<br>- Techniques for hip, knee, and ankle joints<br>- Common cases: hamstring strain, ankle sprain, etc.<br>- Hands-on practice with athletes<br><br>**Session 6: CR and HR Applications on the Trunk and Spine**<br>- Techniques for cervical, thoracic, and lumbar spine<br>- Common cases: low back pain, neck strain, etc.<br>- Hands-on practice with athletes |
| Practical Training | **Session 7: Self-PNF Techniques**<br>- Techniques that can be done independently<br>- Use of simple aids<br>- Home exercise programme<br><br>**Session 8: Assessment and Evaluation**<br>- ROM measurement using a goniometer<br>- Documentation and recording of progress |
| | **Post-Test** |
| **Evaluation Stage of Community Service Programme** | |
| Evaluation of Community Service Programme | Measuring Respondents' Satisfaction Level with Community Service |

Pre-tests and post-tests were conducted to measure the level of knowledge and skills of respondents about Contract Relax and Hold Relax Exercises in Optimising Range of Motion (ROM) in Sports Injuries using a questionnaire and goniometer to measure joint ROM in injured athletes. The knowledge questionnaire contains 20 questions about the Contract Relax and Hold Relax Exercise with a scale of 0-100, and the Skill observation sheet contains 10 items of technique assessment (score 1-5).

The evaluation was carried out after the coaching clinic activity, by conducting an assessment of the partners, namely Papuan athletes, by filling in the instruments that had been prepared by the community service team. The instrument contains participants' responses about the community service

activities that have been carried out. The evaluation was carried out by filling out a community service partner satisfaction level instrument consisting of 40 statement items. The level of partner satisfaction during the community service program is measured based on the indicators listed in Table 2.

**Table 2.** Instrument of partner satisfaction: community service

| Aspects | Indicators |
|---|---|
| - Materials and Understanding | - Understand the principles of Contract Relax and Hold Relax Exercise |
| - Practice and Application | - Accuracy in practicing Contract Relax and Hold Relax Exercise |
| - Effectiveness and Results | - Range of Motion (ROM) improvement after applying the taught techniques |
| - Instructor Competence | - Instructor's ability to deliver material and practice |
| - Sustainability and Impact | - Contribution of Contract Relax and Hold Relax Exercises Optimising Range of Motion (ROM) |

The level of satisfaction of community service participants shown in Table 2 was measured using a Likert scale. This scale serves as a tool to assess how appropriate the question or statement indicators are with the responses given by the participants. Details regarding the measurement scale used in this assessment can be seen in Table 3.

**Table 3.** Criteria Level of satisfaction of community service participants

| Criteria | Score |
|---|---|
| Very Satisfied | 5 |
| Satisfied | 4 |
| Moderately Satisfied | 3 |
| Not Satisfied | 2 |
| Very Dissatisfied | 1 |

Data were analyzed using descriptive and inferential statistical methods. Paired t-test was used to compare pre-test and post-test results, with a significance value of $p<0.05$.

## 3. RESULTS AND DISCUSSION

### Results

Based on the solutions offered through the coaching clinic that have been formulated in the implementation of this community service, the results obtained were 48 athletes participated in this program, with an average age of 15.5 ± 2.5 years.

**Table 4.** Demographic characteristics of participants

| Characteristics | Number (n) | Percentage (%) |
|---|---|---|
| **Gender** | | |
| Male | 30 | 62,5 |
| Female | 18 | 37,5 |
| **Age** | | |
| 13 – 14 | 15 | 31,3 |
| 15 – 16 | 23 | 47,9 |
| 17 – 18 | 10 | 20,8 |
| **Injury History in the Last 1 Year** | | |
| Never | 0 | 0 |
| 1 Time | 18 | 37,5 |
| 2 – 3 times | 20 | 41,7 |
| >3 Times | 10 | 20,8 |

Based on Table 4, it can be seen that the majority of participants were male (62.5 percent), with the largest age group being 15-16 years old (47.9 percent). In terms of injury history, the dominant athlete, 41.7 percent of participants were injured 2-3 times in the past year.

**Implementation phases**

The activity began with a comprehensive assessment of 48 Papuan athletes from several sports. At this stage, athletes were also introduced to the contract-relax and hold-relax techniques through educational sessions. Athletes learned the basic principles of neurophysiological inhibition, the importance of muscle relaxation, and how the contract-relax and hold-relax techniques can improve ROM flexibility.

**Presentation phase**

This phase focused on delivering structured explanations of the contract-relax and hold-relax techniques, supported by visual aids and demonstrations. Athletes were encouraged to engage through discussions and question-and-answer sessions to strengthen their understanding of the techniques.

Before starting the coaching clinic session on Contract Relax and Hold Relax Exercise techniques, the team gave a brief overview of what we will learn, namely, the coaching clinic aims to equip you with knowledge and practical skills in optimizing Range of Motion (ROM) in sports injuries (Figure 2).

**Figure 2.** Briefing athletes
**Figure 3**. Submission of Material by the Community Service Team

This presentation aims not only to provide theoretical knowledge but also practical skills that can be directly applied by Papuan athletes to improve performance and accelerate recovery from sports injuries. At the presentation stage, the team explained the purpose of the coaching clinic, explained the background of the problem of sports injuries in Papuan athletes, and delivered theoretical material including: (1) A Basic explanation of the anatomy and physiology of muscles related to injury; (2) Basic concepts of PNF and neurophysiological principles; and (3) Difference between Contract Relax and Hold Relax Exercise.

Presentation of material on contract relax and hold relax to optimise athletes' ROM using the percentage method with PowerPoint. The presentation material explains that Range of Motion (ROM) is the ability of a joint to move within its optimal range of motion. Contract relax and hold relax are stretching techniques that utilise neurological reflexes to improve ROM flexibility. Contract relax essentially utilises the principles of reciprocal inhibition and autogenic inhibition, while hold relax uses isometric contraction to facilitate muscle relaxation.

## Coaching clinic implementation phase

**Table 5.** Contract relax and hold relax exercise

| Phase | Procedure |
|---|---|
| **Pre-Test** | |
| **Implementation of Contract Relax Exercise** | |
| Positioning | - The athlete is positioned according to the target muscle group.<br>- The service team positions itself to provide optimal resistance.<br>- Ensure stabilization of untreated areas. |
| Contraction Phase | - The athlete isometrically contracts the target muscle against resistance<br>- The service team provides submaximal resistance (approximately 75 percent of maximal strength)<br>- Contraction is maintained for 5-10 seconds<br>- The service team gives verbal instructions: 'push, push, push' |
| Relaxation Stage | - Athletes are asked for complete relaxation after contraction<br>- The service team watches for signs of muscle relaxation<br>- Relaxation period for 2-3 seconds |
| Passive Stretching Phase | - The service team performs passive stretches on the target muscles.<br>- Stretching is done slowly until it reaches the pain limit<br>- The stretch is maintained for 10-30 seconds<br>- Monitoring the athlete's response to the stretch |
| Repetition | - The process is repeated 3-5 times per session<br>- Evaluate ROM changes after each repetition<br>- Adjust intensity based on the athlete's response |
| **Implementation of Hold Relax Exercise** | |
| Positioning | - The athlete is positioned with the antagonist's muscle in a shortened state<br>- The service team positions itself to provide optimal resistance<br>- Ensure stabilization of the untreated area |
| Isometric Contraction Stage | - The athlete performs an isometric contraction of the antagonist muscle<br>- The service team provides appropriate resistance (approximately 75 percent of maximal strength)<br>- Contraction is maintained for 5-10 seconds<br>- The service team gives verbal instructions: 'hold, hold, hold' |
| Full Relaxation Stage | - The athlete is asked for complete relaxation<br>- Therapist watches for signs of muscle relaxation<br>- Period of relaxation for 2-3 seconds |
| Muscle Agonist Activation Stage | - Therapist instructs athlete to actively contract agonizing muscles<br>- Athlete performs active movement in the desired direction<br>- Therapist provides minimal assistance if needed |
| Repetition | - The process is repeated 3-5 times per session<br>- Evaluate ROM changes after each repetition<br>- Adjust intensity according to the athlete's ability |
| **Post-Test** | |
| Evaluation of the Satisfaction Level of Athletes Following the Coaching Clinic | |


**Figure 4.** Material presented

**Figure 5.** Contract relax and hold relax exercise demonstration stage

Contract Relax uses the principle of autogenic inhibition, where isometric contraction of the muscle to be stretched is followed by a period of relaxation before passive stretching is performed. Ensure that the athlete is warm (after 10-15 minutes of warm-up), and position the athlete comfortably and stably. Move the target joint to the ROM limit that the athlete can tolerate. Hold this position for 10-15 seconds, and do not force the movement to the point of pain.

Hold Relax using a combination of autogenic inhibition and reciprocal inhibition through isometric contraction of the antagonist muscle to be stretched. Ensure optimal stabilisation and identify movement patterns to be improved. Move the joint to the comfortable passive ROM limit, hold the position for 10 seconds, and observe the muscle response and the athlete's tolerance. The results of the pre-test and post-test of athletes' knowledge level about Contract Relax and Hold Relax Exercise are shown in Table 6.

**Table 6.** Comparison of pre-test and post-test knowledge scores

| Knowledge Aspect | Pre-Test (Mean±SD) | Post-Test (Mean±SD) | Improvement (%) | p-Value |
|---|---|---|---|---|
| Basic concept of ROM | 45.6±12.7 | 82.3±9.5 | 80.48 | <0.001* |
| Principal Contract Relax | 42.2±14.3 | 79.1±10.8 | 87.44 | <0.001* |
| Principle Hold Relax | 45.5±13.9 | 78.6±11.2 | 72.75 | <0.001* |
| Application of injury | 43.3±15.2 | 80.4±12.1 | 85.68 | <0.001* |

Based on Table 6, there was a significant increase in all aspects of knowledge after the coaching clinic. The highest increase occurred in the knowledge aspect of the Contract Relax principle (87.44 percent), followed by Application to injury (85.68 percent).

**Table 7.** Skill level in performing contract relax and hold relax exercise

| Skill Aspect | Pre-test (Mean±SD) | Post-test (Mean±SD) | Improvement (%) | p-value |
|---|---|---|---|---|
| Initial position | 2.4±0.8 | 4.3±0.6 | 79.2 | <0.001* |
| Contract phase | 2.1±0.7 | 4.11±0.7 | 95.7 | <0.001* |
| Relax phase | 2.4±0.8 | 4±0.8 | 66.7 | <0.001* |
| Hold technique | 2.0±0.6 | 3.9±0.6 | 95.0 | <0.001* |
| Combination of techniques | 2.1±0.7 | 4.0±0.7 | 90.5 | <0.001* |

*Significant at p<0.05

Table 7 shows a significant improvement in all aspects of skills after the coaching clinic. The highest improvement was in the Contract phase (95.7 percent), followed by the Hold technique (95.0 percent). This shows the effectiveness of the coaching clinic program in improving athletes' skills.

The 48 participating athletes measured ROM at the beginning of the program and at the end of the program after applying the Contract Relax and Hold Relax techniques.

**Table 8.** Changes in ROM in athletes with injuries

| Type of Injury | Case | Pre-test ROM (°) | Post-test ROM (°) | Improvement (%) | p-value |
|---|---|---|---|---|---|
| Ankle sprain | 15 | 25.3±5.1 | 36.7±4.9 | 45.1 | <0.001* |
| Knee strain | 10 | 95.6±12.3 | 127.4±11.8 | 33.3 | <0.001* |
| Hamstring strain | 10 | 62.7±8.9 | 86.3V9.2 | 37.6 | <0.001* |
| Shoulder impingement | 7 | 105.2±15.7 | 148±14.3 | 41.3 | <0.001* |
| Lower back pain | 6 | 22.5±4.8 | 35.1±5.1 | 56.0 | <0.001* |

*Significant at p<0.05

Table 8 shows a significant increase in ROM in all types of injuries after the application of Contract Relax and Hold Relax Exercise techniques. The greatest increase occurred in cases of lower back pain (56.0 percent), followed by ankle sprain (45.1 percent).

After the coaching clinic implementation process, including the pre-test, presentation of material, the practice of Contract Relax and Hold Relax Exercise techniques, and post-test, an evaluation was carried out by measuring the level of athlete satisfaction with the coaching clinic, as shown in Table 10.

**Table 9.** Athlete satisfaction level with community service

| Assessment Aspect | Average Score | Category |
|---|---|---|
| Materials and Understanding | 4.49 | Very Satisfied |
| Practice and Application | 4.70 | Very Satisfied |
| Effectiveness and Results | 4.50 | Very Satisfied |
| Instructor Competence | 4.89 | Very Satisfied |
| Sustainability and Impact | 4.42 | Very Satisfied |
| **Total** | **4.60** | **Very Satisfied** |

Table 9 and Figure 6 show the level of satisfaction of respondents after attending the coaching clinic on the application of Contract Relax and Hold Relax Exercise techniques. Satisfaction was highest in instructor competence with a score of 4.89 out of 5, followed by practice and application with a score of 4.70 out of 5.

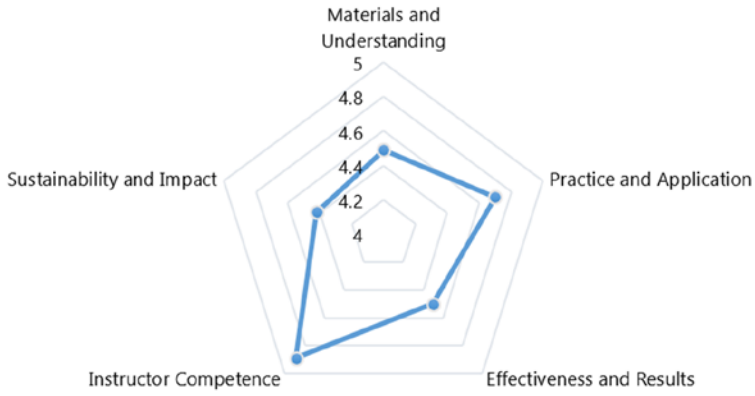


**Figure 6.** Diagram of the satisfaction level of athletes following community service

## Discussion

The results of the coaching clinic showed a significant increase in both the level of knowledge and skills of athletes in applying Contract Relax and Hold Relax Exercise techniques. This shows that the training and mentoring program provided is effective in transferring knowledge and skills to athletes. As stated, proprioceptive neuromuscular facilitation (PNF) is a common practice to improve range of motion. Contract Relax and Hold Relax Exercise techniques show potential benefits if performed correctly and consistently (Hindle et al., 2012). Similar research revealed that the contract-relax intervention was effective in increasing hamstring flexibility by 37 percent immediately after the intervention and maintained for eight minutes afterward, and when applied to stretch the hamstring active muscles, resulted in a large increase in the range of motion (ROM) of knee extension, without reducing athlete performance (Burgess et al., 2019). Direct contract-relax stretching intervention is good to do to improve hamstring muscle flexibility (Wiguna et al., 2019). The results of other studies reveal that contract relaxation can increase hamstring flexibility (Na'ima et al., 2019). Various studies reveal that Contract Relax Stretching exercises influence increasing the flexibility of the hamstring muscles (Saleh, 2018). In addition, contract-relax stretching involves an isotonic contraction against resistance in the injured muscle, followed by a relaxation phase (Wiguna et al., 2019). It is further emphasized that contract-relax techniques reduce the risk of repetitive injury, significantly improve muscle flexibility, and are effective on a variety of muscle groups (Behm & Chaouachi, 2011). Increased knowledge about the application of Kinesio taping and contract-relaxation as a preventive and rehabilitative sports injuries (Kardi et al., 2023).

The results obtained through the coaching clinic showed an increase in the dominant hold-relax technique from the respondents. This is a positive thing for athletes to increase ROM when an injury occurs. The results of previous research revealed that hold relax showed the most significant increase in ROM; besides that, the short-term and long-term effects were better than static stretching, and were able to reduce the risk of injury in athletes. (Kay & Blazevich, 2012) Effectiveness of Proprioceptive Neuromuscular Facilitation (PNF) stretching technique on hamstring muscle flexibility (Oh & Kang, 2021). This study provides important insights into the most effective stretching method to improve the range of motion in the hamstring muscle group. It further explained that PNF stretching with hold relax hamstring, quadriceps, and chest PNF movements can improve flexibility (Al Fajar et al., 2023). As stated, Contract Relax has a higher effectiveness on acute ROM improvement, while Hold Relax is more effective for long-term ROM improvement. The combination of both techniques in a rehabilitation program produces optimal results in various types of musculoskeletal injuries (Lempke et al., 2018).

The results of the coaching clinic also showed that the greatest improvement occurred in cases of lower back pain (56.0 percent). This is in line with previous research, which shows that the Proprioceptive Neuromuscular Facilitation (PNF) technique has a positive effect on the management of chronic low back pain (Gao et al., 2022). Training has a positive impact on Papuan athletes in terms of increasing knowledge about the application of the contract-relaxation as an effort to prevent sports injuries (Ita et al., 2024). This coaching clinic is important because the results of previous research revealed that Papuan athletes were found to have injuries, among others. The results of the study identified cases of sports injuries experienced by athletes, namely sprains, totaling 89 athletes (52.05 percent), strains, 54 athletes (31.58 percent), abrasions, 18 athletes (10.53 percent), bruises, 6 athletes (3.51 percent), and dislocations, 2 people (2.34 percent). The causes of sports injuries identified were overuse of as many as 77 athletes (45.03 percent), less than optimal warm-ups of as many as 37 athletes (21.64 percent), wrong techniques of as many as 16.37 percent, infrastructure that is less supportive of as many as 14.04 percent, and others 2.92 percent (Asri et al., 2025). Based on the problems experienced by athletes, the solutions offered through the Contract Relax and Hold Relax Exercise coaching clinic have a significant impact on improving athletes' knowledge and skills in optimizing ROM. It further explains the optimal choice of Contract Relax and Hold Relax Exercise methods to improve hip flexibility in the context of physical rehabilitation and performance improvement (Yildirim et al., 2016).

Coaching clinics of Contract Relax and Hold Relax Exercise techniques have a vital role in optimizing post-injury ROM recovery of Papuan athletes. This approach not only accelerates recovery but also builds local capacity for more effective and sustainable injury management. The integration of modern knowledge with an understanding of the unique characteristics of Papuan athletes creates a comprehensive and contextualized approach to rehabilitation.

## 4. CONCLUSION AND RECOMMENDATIONS

Community service in the form of a Coaching Clinic Contract Relax and Hold Relax Exercise to optimize ROM in sports injuries of Papuan athletes has high significance in the context of sports and health development in Papua. This program not only benefits the improvement of athlete performance directly but also contributes to local capacity building and equitable access to sports health services. With a sustainable and evidence-based approach, this program has the potential to have a long-term impact on the sports ecosystem in Papua. The Contract Relax and Hold Relax methods were shown to significantly improve the range of motion in Papuan athletes. Both stretching techniques show high effectiveness in improving muscle flexibility. The Contract Relax and Hold Relax techniques utilize neuromuscular principles that help decrease muscle tension and increase soft tissue elasticity, thus optimizing the athlete's range of motion. This approach not only has an impact on improving flexibility but also has the potential to reduce the risk of injury in Papuan athletes by improving joint mobility and muscle elasticity.

The 'Contract Relax and Hold Relax' Training Programme has been implemented, but there are several limitations to this programme, namely the limited duration of the training programme, minimal supporting facilities, and a limited number of respondents in six sports branches. Given these limitations, to optimise the range of motion (ROM) of Papuan athletes, a holistic approach is needed that takes these limitations into account while leveraging local strengths and adapting techniques to existing conditions. Therefore, sports coaches in Papua are advised to integrate the Contract Relax and Hold Relax techniques into athletes' regular training programmes. Adjust stretching methods to the individual characteristics of athletes, taking into account differences in physical condition and type of sport. Conduct an initial assessment to determine the most suitable technique for each athlete. Further research is needed on the long-term effects of the Contract Relax and Hold Relax techniques on Papuan

athletes. Evaluate the effects of these methods on various sports with different characteristics. Monitor athletes' flexibility development regularly. Document changes in range of motion and their relationship to athletic performance. Educate athletes on the importance of flexibility and proper stretching techniques. Develop awareness of the benefits of Contract Relax and Hold Relax in injury prevention and performance enhancement. The implementation of these methods is highly dependent on consistency, quality of execution, and an individually tailored approach for each athlete.

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## REFERENCES

Adler, S. S., Beckers, D., & Buck, M. (2014). *PNF in practice: An illustrated guide (4th Ed.)*. Springer Berlin Heidelberg.

Al Fajar, H., Samodra, Y. T. J., Wati, I. D. P., Yosika, G. F., Gandasari, M. F., & Sofyan, D. (2023). Efektivitas stretching PNF terhadap kelenturan. *Jurnal Pendidikan Jasmani, Olahraga, dan Kesehatan Undiksha*, *11*(1), 42–48. https://doi.org/10.23887/jjp.v11i1.58336

Asri, A., Kardi, I. S., & Ansar, C. S. (2025). Sosialisasi olahraga kesehatan masyarakat di Madrasah Aliyah Al Muhtadin Arso VI Kabupaten Keerom dalam upaya meningkatkan derajat kesehatan. *Solusi Bersama: Jurnal Pengabdian dan Kesejahteraan Masyarakat*, *2*(1), 94-101.

Aziz, M. F., Hasibuan, M. H., & Prabowo, E. (2023). Efektifitas tekhnik PNF hold relax dan contract relax terhadap peningkatan fleksibilitas otot pinggang atlet tim nasional judo. *Jurnal Olahraga Kebugaran Dan Rehabilitasi (JOKER)*, *3*(2), 152–157. https://doi.org/10.35706/joker.v3i2.9993

Behm, D. G., & Chaouachi, A. (2011). A review of the acute effects of static and dynamic stretching on performance. *European Journal of Applied Physiology*, *111*(11), 2633–2651. https://doi.org/https://doi.org/10.1007/s00421-011-1879-2

Burgess, T., Vadachalam, T., Buchholtz, K., & Jelsma, J. (2019). The effect of the contract-relax-agonist-contract (CRAC) stretch of hamstrings on range of motion, sprint and agility performance in moderately active males: A randomised control trial. *South African Journal of Sports Medicine*, *31*(1), 1–5. https://doi.org/10.17159/6091

Gao, P., Tang, F., Liu, W., & Mo, Y. (2022). The effects of proprioceptive neuromuscular facilitation in treating chronic low back pain: A systematic review and meta-analysis. *Journal of Back and Musculoskeletal Rehabilitation*, *35*(1), 21–33. https://doi.org/10.3233/bmr-200306

Guntoro, T. S., Kurdi, K., & Putra, M. F. P. (2020). Karakter kepribadian atlet Papua: Kajian menuju POPNAS ke-XV. *Jurnal SPORTIF/ : Jurnal Penelitian Pembelajaran*, *6*(1), 40–58. https://doi.org/10.29407/js_unpgri.v6i1.13638

Harmianto, D. P., Nurman, M., Erlinawati, E., & Arge, W. (2024). Hubungan pengetahuan tentang RICE (Rest, Ice, Compression, Elevation) dengan penerapan penanganan cedera olahraga jenis sprain dan strain pada atlet football club di Kabupaten Kampar. *Jurnal Pahlawan Kesehatan*, *1*(3), 106-112.

Harmon, K. G., Clugston, J. R., Dec, K., Hainline, B., Herring, S., Kane, S. F., Kontos, A. P., Leddy, J. J., McCrea, M., Poddar, S. K., Putukian, M., Wilson, J. C., & Roberts, W. O. (2019). American medical society for sports medicine position statement on concussion in sport. *British Journal of Sports Medicine*, *53*(4), 213–225. https://doi.org/10.1136/bjsports-2018-100338

Hindle, K. B., Whitcomb, T. J., Briggs, W. O., & Hong, J. (2012). Proprioceptive Neuromuscular Facilitation (PNF): Its mechanisms and effects on range of motion and muscular function. *Journal of Human Kinetics, 31*, 105–113. https://doi.org/10.2478/v10078-012-0011-y

Ita, S. (2017). Peminatan masuk PPLP Papua berbasis cabang olahraga. *Jurnal Pendidikan Jasmani Olahraga Dan Kesehatan*, *3*(1), 35–48.

Ita, S., Hasan, B., Kardi, I. S., Guntoro, T. S., Ibrahim, Ansar, C. S., Putra, I. P. E. W., Asri, A., Yudistira, I., & Logo, Y. (2024). Pelatihan penerapan contract relax sebagai upaya pencegahan cedera olahraga Atlet Papua. *Jurnal Pengabdian Olahraga Di Masyarakat*, *5*(1), 49–57.

Kardi, I. S., Putra, I. P. E. W., Leni, A. S. M., Ibrahim, I., Hasan, B., Nurhidayah, D., Ansar, C. S., Nopiyanto, Y. E. (2023). Pelatihan penerapan kinesiotaping kombinasi contract relax sebagai tindakan preventif dan rehabilitatif sport injuries. *GEMASSIKA: Jurnal Pengabdian Kepada Masyarakat*, *7*(2), 179–188. https://doi.org/10.30787/gemassika.v2i2.1136

Kardi, I. S., Wijaya, I. P. E., Hasan, B., Ibrahim, CS, A., Kurdi, Muhammad, J., Nasruddin, Yudistira, I., & Sahruni, A. Y. (2024). Coaching clinic pemasangan kinesio taping pada kasus cedera olahraga atlet remaja. *JPKM: Jurnal Pengabdian Kepada Masyarakat*, *30*(2), 249–254.

Kay, A. D., & Blazevich, A. J. (2012). Effect of acute static stretch on maximal muscle performance: A systematic review. *Medicine and Science in Sports and Exercise*, *44*(1), 154–164. https://doi.org/10.1249/mss.0b013e318225cb27

Kementerian Pemuda dan Olahraga Republik Indonesia. (2023). *Laporan Kinerja Tahun 2023: Pemuda Maju*.

Kusuma, K. C. A., Ariani, L. P. T., & Muliarta, I. W. (2022). Edukasi pencegahan cedera olahraga bagi Atlet Pencak Silat Satria Muda Indonesia. *Proceeding Senadimas Undiksha*, 26-32.

Lempke, L., Wilkinson, R., Murray, C., & Stanek, J. (2018). The effectiveness of PNF versus static stretching on increasing hip-flexion range of motion. *Journal of Sport Rehabilitation*, *27*(3), 289–294. https://doi.org/10.1123/jsr.2016-0098

Lima, C. D., Ruas, C. V., Behm, D. G., & Brown, L. E. (2019). Acute effects of stretching on flexibility and performance: A narrative review. *Journal of Science in Sport and Exercise*, *1*(1), 29–37. https://doi.org/10.1007/s42978-019-0011-x

Marek, S. M., Cramer, J. T., Fincher, A. L., Massey, L. L., Dangelmaier, S. M., Purkayastha, S., Fitz, K. A., & Culbertson, J. Y. (2005). Acute effects of static and proprioceptive neuromuscular facilitation stretching on muscle strength and power output. *JAT: Journal of Athletic Training, 40*(2), 94–103.

Na'ima, A. L., Sari, G. M., & Utomo, D. N. (2019). Combination effect of core stability exercise and contract relax exercise on hamstring flexibility. *Journal of Physics: Conference Series*, *1146*. https://doi.org/10.1088/1742-6596/1146/1/012035

Oh, J.-S., & Kang, M.-H. (2021). The Effectiveness of hamstring stretching with proprioceptive neuromuscular facilitation versus jack-knife stretching for individuals with hamstring tightness. *Journal of Musculoskeletal Science and Technology*, *5*(1), 14–20. https://doi.org/10.29273/jmst.2021.5.1.14

Page, P. (2014). Clinical commentary current concepts in muscle stretching for exercise and rehabilitation. *The International Journal of Sports Physical Therapy*, *7*(1), 109-119.

Puspitasari, N. (2019). Faktor kondisi fisik terhadap resiko cedera olahraga pada permainan sepakbola. *Jurnal Fisioterapi Dan Rehabilitasi*, *3*(1), 54–71. https://doi.org/10.33660/jfrwhs.v3i1.34

Rusli, T. S., Boari, Y., Amelia, D., Rahayu, D., Setiaji, B., Suhadariyah, S., Syarfina, S., Ansar, C. S., Syahruddin, S., Amiruddin, A., Yuniwati, I. (2022). *Pengantar Metodologi Pengabdian Masyarakat*. Yayasan Penerbit Muhammad Zaini.

Saleh, M. F., & Rahayu, U. B. (2018). *Latihan Contract Relax Stretching dapat Meningkatkan Fleksibilitas Otot Hamstring.* (Skripsi, Universitas Muhammadiyah Surakarta).

Setyaningrum, D. A. W. (2019). Cedera olahraga serta penyakit terkait olahraga. *Jurnal Biomedika Dan Kesehatan*, *2*(1), 39–44. https://doi.org/10.18051/jbiomedkes.2019.v2.39-44

Tambaip, B., & Tjilen, A. P. (2023). Analisis Kebijakan Publik Dalam Derajat Kesehatan Di Papua. *Jurnal Kebijakan Publik*, *14*(1), 101. https://doi.org/10.31258/jkp.v14i1.8232

Tobing, M. U. L. (2019). *Pengaruh Pemberian Latihan Range of Motion (Rom) Pasif Terhadap Fleksibilitas Sendi Lutut Lansia Di Wilayah Kerja Puskesmas*. (Skripsi, Universitas Aufa Rohyan).

Wiguna, P. D. A., Muliarta, I. M., Wibawa, A., Adiputra, L. M. I. S. H. (2019). Intervensi contract relax stretching direct lebih baik dalam meningkatkan fleksibilitas otot hamstring dibandingkan dengan intervensi contract relax stretching indirect pada mahasiswa program studi fisioterapi fakultas kedokteran Universitas Udayana. *Majalah Ilmiah Fisioterapi indonesia, 2*(1), 40–44.

Yildirim, M. S., Ozyurek, S., Tosun, O., Uzer, S., & Gelecek, N. (2016). Comparison of effects of static, proprioceptive neuromuscular facilitation and Mulligan stretching on hip flexion range of motion: A randomized controlled trial. *Biology of Sport*, *33*(1), 89–94. https://doi.org/10.5604/20831862.1194126