

Effect of Static Contraction on The Rate of Healing of *Perineal Wounds* in *Postpartum* Mothers with *Perineal Tears*

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ABSTRACT

Introduction: *Static contraction* is an isometric muscle contraction exercise without any modification of muscle length and without any activity in the joints which is beneficial to increase muscle strength. *Static contraction* with kegel exercise is beneficial in accelerating the wound healing process of perineal tears. Based on WHO data, almost 90% of normal labor methods experience *tears* either with or without episiotomy **methods:** This study used a *Quasi-experimental* research method. The population obtained was 24 people. A total of 20 people were used as samples in this study which were divided into treatment groups and control groups. *Static contraction* exercises were given to the treatment group and stretching was given to the control group. Measurement of wound healing rate was measured using *REEDA Scale*. **Results:** The results of the *Wilcoxon range test* in the treatment group had a p value = 0.005 which indicated a significant effect and in the control group had a p value = 0.003 which indicated a significant effect. Then the *mann-whitney* test was carried out to determine the difference in influence between the treatment group and the control group of *static contraction* variables on the healing rate of *perineal wounds* with the results of the p value = 0.045 which means that there is a significant difference in influence between the treatment group and the control group. **Conclusion:** there is an effect of *static contraction* on the rate of healing of *perineal wounds* in spontaneous birth *postpartum* mothers with *perineal* tears.

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INTRODUCTION

Spontaneous labor is a vaginal birth that is carried out without the help of tools and only relies on the mother's strength and efforts to force the baby out (Sulfianti et al., 2020). Spontaneous labor has the potential to cause a tear in the *perineum*. *Perineal* tear itself is an injury to the vagina that occurs during fetal delivery with or without the help

of tools (Sari et al., 2022). Tears in the perineum can arise due to direct or accidental rupture (Kurniawan et al., 2020). According to the *American College of Obstetricians and Gynecologist* perineal tears are classified into four levels: Level 1 lacerations occur on the perineal skin, level 2 lacerations occur on the *Perineal Muscle* but excluding the *sphincter*, level 3 lacerations occur on the anal muscle and *sphincter*, and level 4 lacerations occur on the anal sphincter muscle and rectal *epithelium* (Cakwira et al., 2022). Based on WHO data (2014) almost 90% of normal labor methods experience *tears* either with or without episiotomy (Istiana et al., 2020). According to WHO data in 2014, the incidence of perineal tears in mothers giving birth was 2.7 million cases and the higher the incomprehension of midwives regarding midwifery care, it is estimated that until 2050 these cases will increase to 6.3 million cases (Candrayanti, 2019). In 2013, perineal lacerations due to spontaneous tears were about 29%, 28% due to episiotomy, and as many as 57% due to mothers with perinatal sutures from a total of 1951 spontaneous pervaginal births (Susilawati & Ilda, 2013; Susilawati & Ilda, 2019).

Wound healing time in perineal tears is said to be normal if within 7 days the wound has no signs of inflammation. Wound healing is said to be abnormal if it heals in more than 7 days (Tarsikah et al., 2018). The duration of perineal wound healing in both episiotomy and 1st and 2nd degree spontaneous perineal tears is almost the same and has no difference. *Perineal* wound care, consumption of foods with high nutritional and protein content, and the provision of *exercise as early as possible* such as Kegel *exercise* can accelerate the healing process of perineal *wounds* (Yunifitri & Aulia, 2022)..

Based on research conducted by Hariani (2021) Static contraction with kegel *exercise* can accelerate *perineal wound* healing in mothers after childbirth, this situation is caused by the activity in the muscles that contract and relax when doing Kegel exercises can improve blood circulation and tissue oxygen so that the oxygenation effect can accelerate the healing process of perineal wounds. Research Antini (2016) *Static contraction* is an isometric muscle contraction *exercise* without any modification of muscle length and without any activity in the joints which is beneficial to increase muscle strength (Dewanti et al., 2022). Kegel exercises are exercises introduced by Dr. Arnold Kegel in 1940, namely exercises performed by stretching and relaxing the vagina which results in increased pelvic floor muscle strength (Maya et al., 2019).

LITERATURE REVIEW

Labor is a procedure for the birth of the fetus, uri and lining from the uterus through the vagina which begins with the process of opening and dilating the cervix caused by regular uterine contractions and is said to be normal if it occurs without obstacles and at full gestational age, namely 37 weeks (Yuriati & Khoiriyah, 2021). Labor can take place spontaneously or by *sectio caesarea*. Spontaneous labor is a method of delivering a baby through the birth canal (vagina) without the help of any tools but purely with the strength and efforts of the mother. Spontaneous labor has the potential to cause tears in the perineum (Sulfianti et al., 2020).

Perineal tears are tissue lesions that occur during pervaginal delivery. These lesions can be classified into 4 degrees: First degree only affects the *vaginal mucosa* or *perineal skin*; second degree affects the *perineal muscle* but not the *anal sphincter*; third degree affects the *anal sphincter*; fourth degree affects the *rectal mucosa*. Third-degree perineal tears are divided into 3 types: (3a) less than 50% of the *external anal sphincter*; (3b) more than 50% of the *external anal sphincter*; (3c) both *external* and *internal anal sphincters*. The higher the degree of perineal laceration, the longer the wound healing time of perineal laceration (Álvarez-González et al., 2021)..

There are two aspects that affect perineal wound healing, namely; internal aspects and external aspects. External aspects include community traditions, maternal knowledge, nutrition in the food consumed, and the actions of staff during labor. While the internal aspects in question are the age of the mother, *personal hygiene*, and the mother's daily activities (Herlina *et al.*, 2020).. There are three stages of the wound healing process, namely the *inflammatory phase*, *proliferation phase*, and *remodeling phase*. *Inflammatory phase* has 2 phases, namely the *homeostasis phase* and the *phagocytosis phase*. *Homeostasis* will immediately take place when an injury occurs to stop bleeding. After *homeostasis* is complete, dead tissue and bacteria will be destroyed by neutrophils by *phagocytosis*. This phase starts immediately after the injury for up to 3 or 4 days. In the *proliferation phase* *fibroblasts* will begin to produce *extracellular matrix* to fill the wound space. Angiogenesis also occurs in this phase. *Remodeling phase* or maturation phase aims to optimize the strength and structure of the tissue covering the wound, forming epithelium, and scar tissue formation (Primadina *et al.*, 2019).. Postpartum mothers are allowed to mobilize, namely in the first 6 hours of normal birth, and the first 8 hours in *sectio caesarea*. This means that at that time the mother is allowed to do static contractions with Kegel exercises. Mothers after giving birth can do Kegel exercises in a way such as holding back urination, holding the contraction for 6 seconds and then relaxing. The movement is repeated 3x a day for 7 days for optimal results (Yunifitri & Aulia, 2022).

Static contraction is an *exercise* that results in the muscles given exercise not experiencing modification in muscle length and no activity in the joints so that this *exercise* results in increased muscle contraction with a fixed muscle length (Yohana & Intarti, 2019). The static contraction used in this study is kegel *exercise*. The mechanism of muscle contraction and relaxation when doing kegel *exercise* can affect the pelvic floor muscles, namely the *pubococcygeal muscles*. Where when the *pubococcygeal muscle* contracts it can increase blood circulation and oxygen in the tissue, so that the oxygenation effect can accelerate the healing process of tissue wounds. This can happen because when contraction occurs, the pressure in the bloodstream also increases which results in blood circulation becoming smooth (Hariani, 2021).

METHOD

This study used a *quasi-experimental* research design with the aim of knowing the effect of static contraction on the rate of healing of *perineal wounds* in *postpartum* mothers of spontaneous birth with *perineal rupture* at Rumah Bidan Rina Blimbing, Malang City by comparing the rate of wound healing between two groups. In this study, static contraction exercises will be given to the treatment group, while the control group will be given stretching. This research has received ethical eligibility KEPK University of Muhammadiyah Malang No.E.5.a/312/KEPKUMM/XI/2023.

This study used a population of spontaneous birth post partum mothers at the Rina Blimbing Midwife House, Malang City, totaling 24 respondents. Sampling used probability sampling technique with simple random sampling method. After sampling in accordance with the exclusion criteria, inclusion criteria, and drop out criteria from 24 populations, a sample of 20 respondents was obtained with the division of the treatment group of ten respondents and the control group of ten respondents.

This study used independent variables of static contraction and dependent variables of *perineal wound* healing rate. The level of *perineal wound healing* is measured using the REEDA Scale with an ordinal data scale. The Wilcoxon test will be carried out after the data is obtained with the aim of knowing the effect of static contraction in the treatment and control groups as measured through the *pretest post-test* then to find out the

difference in the effect of static contraction in the treatment group and the control group, the *Mann-Whitney* test is carried out.

RESULT AND DISCUSSION

After conducting research on samples that fit the criteria of 20 respondents with a total population of 24 respondents. The following results can be seen in Table 1.

Table 1 Characteristics of Respondents (N= 20)

variable	Category	Frequency	Percent
Age	< 20	1	5
	20-35	18	90
	>35	1	5
Degrees	I	6	30
	II	14	70
	III	0	0
	IV	0	0
Parity	Primiparous	4	20
	Multiparous	15	75
	Grandepara	1	5
Birth Distance	0 years	4	20
	< 2 years	2	10
	≥ 2 years	12	70
Take wound healing supplements	Yes	0	0
	No	20	100
Wound healing rate Pretest	Healed (0)	0	0
	Moderate healed (1-5)	11	55
	Middly healed (6-10)	9	45
	Not healed (11-15)	0	0

The majority of respondents who experienced *perineal rupture* were in the age range of 20-35 years, 18 people (90%). The degree of tearing experienced by respondents was in degree I as many as 6 people (30%) and II as many as 14 people (70%). Parity in the majority of respondents was multiparous as many as 15 people (75%) with the majority of respondents' birth spacing of more than 2 years as many as 12 people (70%). The level of wound healing on the first day after childbirth was in the *moderate healed* category of 11 people (55%) and at *middly healed* a total of 9 people (45%) (Table 1).

The *Wilcoxon range test* of the static contraction variable on the healing rate of *perineal wounds* in the treatment group with the results of $p = 0.005$ which means <0.05 , so from these results it shows that there is an effect of giving static contraction on the healing of *perineal wounds* and the mean REEDA Scale results before intervention in the treatment group were 5.3 and after intervention decreased by -3.6. While in the control group the P value = 0.003 which means <0.05 , the results of the study indicate a significant effect. The mean REEDA Scale results in the control group were 5.3 and after stretching on day 3 decreased by -2. The results of the *mann-whitney* test to determine the difference in influence between the treatment group and the control group of static contraction variables on the healing rate of *perineal wounds* have a p value = 0.045 which means <0.05 , so these results indicate a significant difference in influence between the treatment group and the control group.

Table 2 *Wilcoxon Rank Test and Mann-whitney Test Results*

	Treatment	Control	P-Value
Average REEDA Pre	5.3	5.3	
Average REEDA Post	1.7	3.3	
	P= 0.005	P= 0.003	
Difference REEDA	-3.6	-2	0.045

Based on the results of the research analysis that has been carried out using the REEDA Scale measurement to assess the level of healing of *perineal wounds* and using the Wilcoxon test ranked to determine the effect of static contraction on the level of healing of *perineal wounds* in the experimental group, a P value of 0.005 (<0.05) is obtained which indicates the effect of static contraction on the level of healing of *perineal wounds* in the treatment group. While in the control group, the P value was 0.003 (<0.05) which indicated the effect of static contraction on the control group. From the results of the study, it can be seen that there is an effect of static contraction both in the treatment group or the group given training in the form of static contraction and in the control group or the group that is only given stretching. However, from the results of the average difference between *pretest* and *posttest* in the treatment group and control group, the effect of stretching on the control group was not as great as the effect of static contraction on the treatment group. This situation can occur because the stretching given to the control group focuses more on the lower extremities so that the effect is not too much on perineal tears. The second test conducted was the mann-whitney test aimed at comparing the effect of static contraction on the healing rate of perineal wounds between the treatment group and the control group, obtained a P value of 0.045 (<0.05) which indicates a difference in the effect of static contraction on the healing rate of *perineal wounds* between the treatment group and the control group.

Static contraction is an *exercise* that causes the muscles trained to not experience modification of muscle length and activity in the joints so that this exercise causes increased muscle contraction with a fixed muscle length (Yohana and Intarti, 2019). The static contraction used in this study is kegel *exercise*. Kegel *exercise* is an *exercise* created by Arnold Kegel in 1940 which is used to increase pelvic floor muscle strength by contracting and relaxing the *pubococcygeus* muscle or muscles in the pelvic floor (Abu Raddaha and Nasr, 2022). The mechanism of muscle contraction and relaxation when doing kegel *exercise* can improve blood flow and oxygen in the tissue, so that the oxygenation effect can accelerate the healing process of tissue wounds (Hariani, 2021). Kegel *exercise* is part of postpartum exercises that are useful for closing the perineal suture wound, accelerating perineal wound healing, relieving hemorrhoids, and controlling urinary incontinence (Maya *et al.*, 2019).

The results of the research conducted are in line with the results of a previous study conducted by Fitri *et al.* (2019) with the results of mothers who do Kegel exercises experiencing a better *wound healing process* than mothers who do not do Kegel exercises. The two groups in the study had different lengths of wound healing processes. In research conducted by Purwaningrum and Herawati (2022) kegel *exercise* affects *perineal wound healing*. It is also explained that this situation is caused by the activity of contraction and relaxation of muscles can increase circulation in the tissue so that it can accelerate healing and close the sutures in the perineum due to perineal laceration.

Increasing age has been linked to a slowing of the body's regeneration process, which can lead to health complications such as chronic wounds and an increased risk of infection. In the elderly, the body's immune system is in a state of inflammation that

occurs with age, which if it occurs endlessly, it will cause the body's ability to regulate tissue repair in the wound healing process to decrease (Silberman *et al.*, 2023).. However, this theory is not in line with the research findings obtained.

Based on the results of the peletilian analysis, it shows that the healing rate of perineal wounds at the age of <20 years is 1 person at the *moderate* healed level, in the age range of 20-35 years a total of 18 people are at an average level of moderate *healed*, and at the age of >35 years a total of 1 person is at the *moderate healed level*. This shows that there is no relationship between the level of healing of *perineal wounds* and the age of the mother. These results are in line with the study conducted by Manuntungi *et al.* 2019) who concluded that maternal age did not affect the length of perineal wound healing.

Perineal rupture usually occurs in pervaginal delivery, either spontaneously or by episiotomy. There are 4 degrees of perineal tears. Grade I tears are fairly small so suturing is not done unless recommended by a doctor, grade II needs stitching, while degrees 3 and 4 usually require surgery (Hartinah *et al.*, 2021). Based on the analysis of the study, it shows that the level of healing of perineal wounds in degree I is 6 people, 3 of whom are at the *healed level*, namely at score 0. while in degree II there are 14 people, 6 of whom are at the *moderate healed* level, namely at scores 1-5. This shows that there is a relationship between the degree of *perineal* tears and the level of healing of *perineal wounds*. The higher the degree of perineal tear, the higher the level of *perineal wound* healing.

The incidence of *perineal rupture* was twice as high in primiparous births with an incidence of 40%. The risk of perineal tears was greater in primiparous women than multiparous with an incidence ratio of 6% and 4% (Okeahialam *et al.*, 2022).. However, this theory is not in line with the findings of this study. Based on the analysis of the results of the study showed that perineal tears in primiparous births occurred as many as 4 respondents, in multiparous births there were 15 respondents, and in grandeparous births there were 1 respondent. The results of this study are in accordance with the results of research conducted by Qomarasari (2022) who concluded that parity has no relationship with the incidence of perineal tears. This can happen because there are still many other aspects that can lead to the incidence of perineal tears such as the lack of elasticity of the mother's perineum, and the mother's mistake when straining.

CONCLUSION

The conclusion of this study is that there is an effect of static contraction on the healing rate of *perineal wounds* in spontaneous birth *postpartum* mothers with *perineal* tears. In addition, there are also differences in the effect of static contractions on the healing rate of *perineal wounds*, where better results are obtained in the group given static contraction exercises. Static contraction exercises in the form of Kegel exercises are still not widely applied in the health services of *postpartum* mothers, because seeing the effect produced is good for the healing of perineal wounds, it is hoped that in the future responsible health workers can apply these exercises after mothers give birth. Future research is expected to carry out the same assessment with a larger population such as in hospitals and it is hoped that further research can fully monitor patients such as ensuring the patient's method and time when doing the exercise is correct.

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