VILNIUS UNIVERSITY

MEDICAL FACULTY

The Final thesis

Anatomical Variations of the Sciatic Nerve

Student Name **Antonio John Meschino, VI year, 4th group.**

Department/ Clinic **Institute of Clinical Medicine. Clinic of Rheumatology, Orthopaedics Traumatology and Reconstructive Surgery.**

Supervisor Assoc. Prof. Igoris Šatkauskas

Consultant Assoc. Prof. Andrej Suchomlinov

The Head of Department/Clinic Prof. Irena Butrimienė

2024

Email of the student antonio.meschino@mf.stud.vu.lt

TABLE OF CONTENTS:

ABSTRACT...2

INTRODUCTION...3

METHODS AND MATERIALS..4

RESULTS..7

DISCUSSION..14

CONCLUSION...18

REFERENCES...19

EXTRAS..22

Abstract

Objective: The goal of the study was to identify and examine the anatomical variations of the proximal sciatic nerve in relation to the piriformis muscle and to compare the results with previously conducted studies analysing anatomical variations in this area.

Materials and Methods: Seventeen human adult cadavers (34 lower limbs, 10 female and 7 male) were dissected to expose the sciatic and piriformis muscle in the retro-trochanteric space and observed anatomical variations were described and reported. Anatomical variations were classified according to the Beaton and Anson classification.

Results: Anatomical variations were observed in 4 cadavers (12%) of the specimens, with two cadavers displaying unilateral variations and one cadaver showing bilateral variations of the exact same type. All the variations were found in female specimens.

According to the Beaton and Anson classification 30 limbs (88%) were classified as Type A, i.e., the sciatic nerve passes underneath the piriformis muscle. 3 limbs (9%) were classified as type B, i.e., the tibial division pierces through the piriformis forming two distinct muscular bellies, while the common peroneal division crosses underneath the muscle.

Type C, D, E, F according to the Beaton and Anson classification were not found in this study. We also found a previously unreported variant, where the peroneal division of the sciatic nerve passes below the piriformis and the tibial division separates into two nerve branches splitting the piriformis into three distinct separate muscle bellies.

Conclusion: Our results align with the results of the existing literature, with Type A being the most common variation followed by Type B. However, we discovered a previously unreported rare variation that has not been described in any of the existing classifications for the sciatic nerve-piriformis junction. This finding highlights the extreme anatomical variability of the sciatic nerve and its branches and reminds us once again the importance of cadaveric studies in deepening our understanding of human anatomy in order to reduce surgical complications and explore the possible clinical significance of all the existing variations.

Keywords: Sciatic nerve, Piriformis muscle, Variations

Introduction

The sciatic nerve is the largest nerve in the body and it originates from the sacral plexus in the pelvis. It is formed by the combination of nerve roots from the L4 to S3 spinal segments. Exiting the pelvis through the greater sciatic foramen, it usually travels beneath the piriformis muscle. While the sciatic nerve follows a defined path along the posterior thigh, crossing the long head of biceps femoris, it eventually divides into the tibial and common peroneal nerves proximal to the knee, albeit with a variable bifurcation level. Prior to this division, the tibial and common peroneal nerve maintain structural independence, loosely connected as the sciatic nerve. The tibial nerve, arising from the anterior divisions of the sacral plexus, and the common fibular nerve, composed of the posterior divisions of the plexus, which exhibit distinct origins. (1) (2) Medial (tibial) component supplies the posterior thigh muscles, while the lateral (common fibular) component innervates the short head of biceps femoris.

Despite a well characterized pathway, the sciatic nerve is known to exhibit anatomical variability and several classifications of its anatomical variants exist (1) (2). Most of these classifications stem from the relationship between the sciatic nerve and the piriformis muscle. The piriformis muscle originates from the anterior surface of the second through fourth sacral vertebrae, the sacrotuberous ligament, and the superior margin of the greater sciatic notch. The muscle then exits horizontally through the greater sciatic notch and attaches to the superior part of the greater trochanter. According to the hip position, the piriformis can function as an abductor (during hip flexion) or as an external rotator (during hip extension). (3)

Our hypothesis is that the sciatic nerve may exhibit greater anatomical variability with respect to the piriformis muscle than previously reported. The purpose of the present study was to dissect and analyze sciatic nerve variations around the piriformis muscle ant to compare them with the existing literature, as the exploration and possible identification of unknown anatomical variations within the sciatic nerve pathway may allow better understanding of the etiology of relevant clinical conditions such as sciatica, deep gluteal pain syndrome and piriformis syndrome. (3) (4) (5) (6) (7) (8)

Methods and Materials

This cadaver study was conducted on 17 cadavers (7 male, 10 female; 34 limbs) of individuals who donated their bodies to the Department of Anatomy, Histology, and Anthropology at the Faculty of Medicine of Vilnius University. Each participant in this study had previously signed a comprehensive consent form, providing explicit permission for their donated bodies to be utilised for scientific research purposes. This ensures that the study was conducted with the utmost respect for the wishes of the donors and adhering to ethical standards in the pursuit of scientific knowledge.

All the cadavers underwent preservation through injection with a 10% Formalin solution, ensuring adequate preservation and suitability for scientific exploration. The gluteal regions of the limbs were opened with careful surgical dissection. The fascia lata was split at the level of the greater trochanter and the underlying gluteus maximus muscle was split to expose the retrotrochanteric space. After removal of the trochanteric bursa, the gluteus medius, the piriformis muscles together with the sciatic nerve and the other external rotators were exposed. The posterior compartment of the thigh was dissected as well; the semitendinosus muscle was split from the long head of biceps femoris muscle to expose the continuation of the sciatic nerve. The nerve itself was dissected and neurolysed from surrounding structures using blunt methods and instrumentation to avoid any structural damage. The sciatic nerve relation to the piriformis muscle and any abnormality or variation of tibial and common peroneal nerve divisions in relation to the piriformis muscle was carefully analyzed, noted, and photographed.

The Beaton and Anson (9) and Barbosa classification models (10) were used to classify the variation types discovered. The Beaton and Anson classification was first described and published in 1937 (11) (9) and it separates the variations into 6 different types (A to F, Figure 1). A detailed 13 Type classification published by Ana Beatriz Marques Barbosa in Brazil (10) was also used to classify our findings (Figure 2).

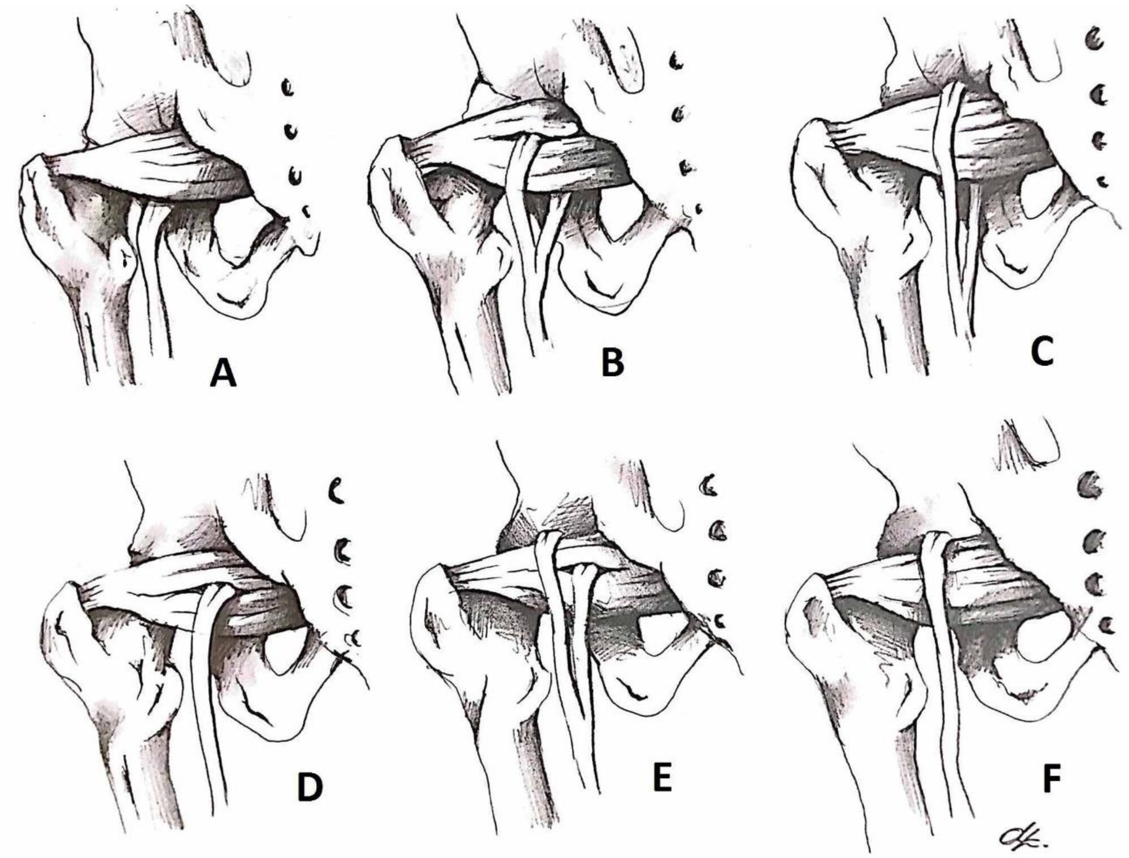

Figure 1: Beaton and Anson classification system (10) (8)

Type A – standard pattern. The whole SN travels below the PM. No divisions.

Type B – the TN travels below the PM and CPN travels through PM forming two bellies.

Type C – the TN travels below the PM and CPN travels above the PM.

Type D – the whole SN travels through the PM forming two bellies. No divisions of nerve.

Type E – the TN travels through the PM forming two bellies and CPN travels above the PM.

Type F – the whole SN travels above the PM. No divisions.

SN – Sciatic Nerve; PM – Piriformis Muscle; TN – Tibial nerve; CPN – Common Peroneal Nerve.

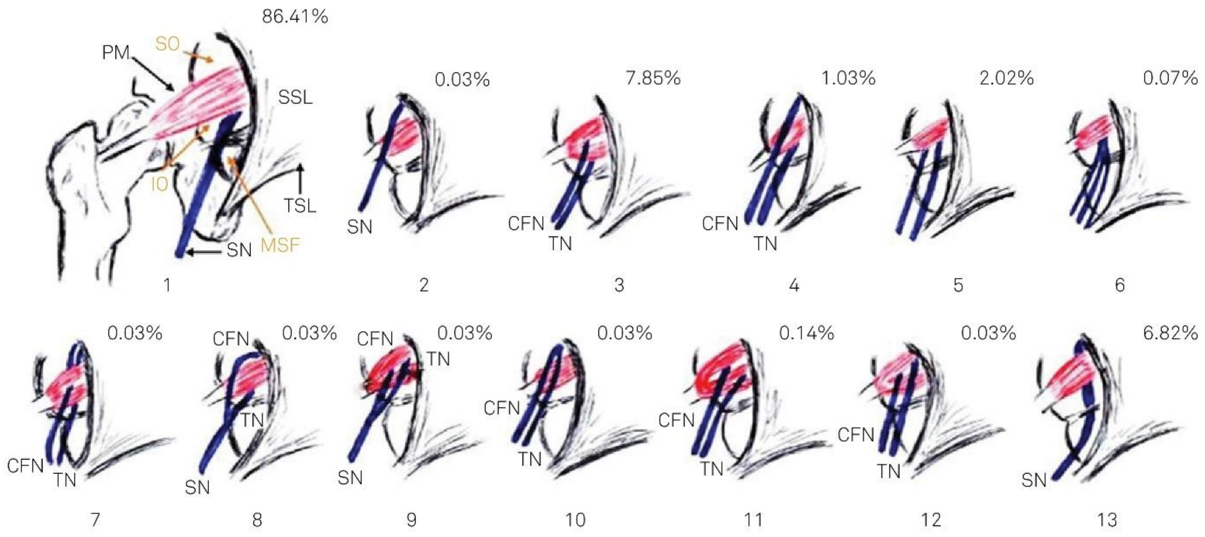

Figure 2: 13 Type classification established by Ana Beatriz Marques Barbosa in Brazil (9)

Type 1 - standard pattern. The whole SN travels below the PM. No divisions; Type 2 - the whole SN travels above the PM. No divisions; Type 3 - the TN travels below the PM and CPN travels through PM forming two bellies; Type 4 - when the CPN passes above the PM and the TN travels below PM; Type 5 - when there is a high bifurcation of the TN; Type 6 - when a SN trifurcation occurs below the PM into the TN, abnormal trunk and common fibular branch; Type 7 - when the SN emerges divided and the CPN passes between the heads of a double PM, while the TN passed beneath the PM; Type 8 - when the CPN passes over the PM and then joins with the TN that passed beneath the PM; Type 9 - when the TN and CPN pass between the superficial and deep ventricles of the PM and then join; Type 10 - when the SN divides and both divisions pass above the PM; Type 11 - when the PM has three muscular bellies and the CPN passes between the superficial and intermediate belly and the TN passes over the deep belly; Type 12 - when both root terminals of the SN pass through the ventricles of the PM; Type 13 - when the SN exits the pelvis through the smaller sciatic foramen. (9)

SN – Sciatic Nerve; PM – Piriform Muscle; TN – Tibial nerve; CPN – Common Peroneal Nerve.

Results

Out of the 34 limbs, 30 (82.35%) limbs appeared to display the standard pattern with the sciatic nerve traveling underneath the piriformis muscle (Figure 3; Figure 4). According to Beaton and Anson classification, this anatomical pattern would be described as Type A (Figure 1) and according to Barbosa it would be Type 1 (Figure 2). Four limbs (11.76%) showed different anatomical variations. All these non-standard anatomical variations occurred in female cadavers, three variations occurred on the right side and one on the left side of the body (Table 1, 2, 3 and~~,~~ 4). Two cases occurred of unilateral variations and one case of bilateral variations, meaning two variations occurring on one cadaver on both sides.

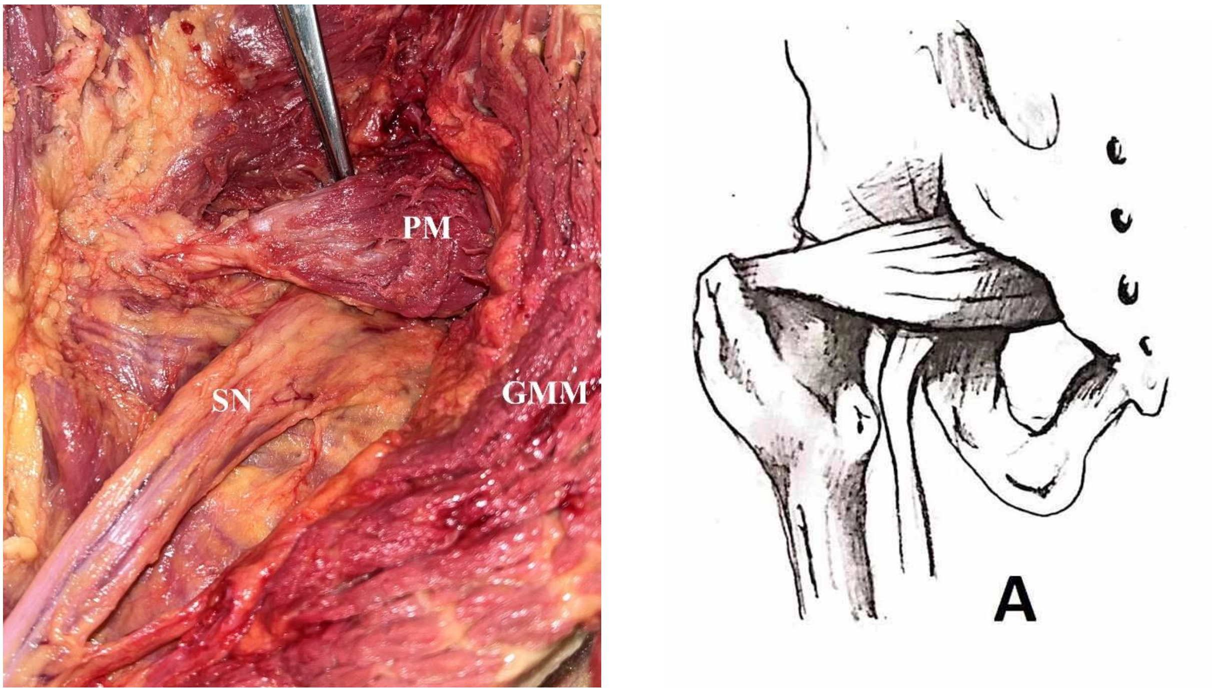

Figure 3: Type A classification of sciatic nerve variation. SN travels below the PM.

SN – Sciatic Nerve; PM – Piriform Muscle; GMM – Gluteus Maximus Muscle

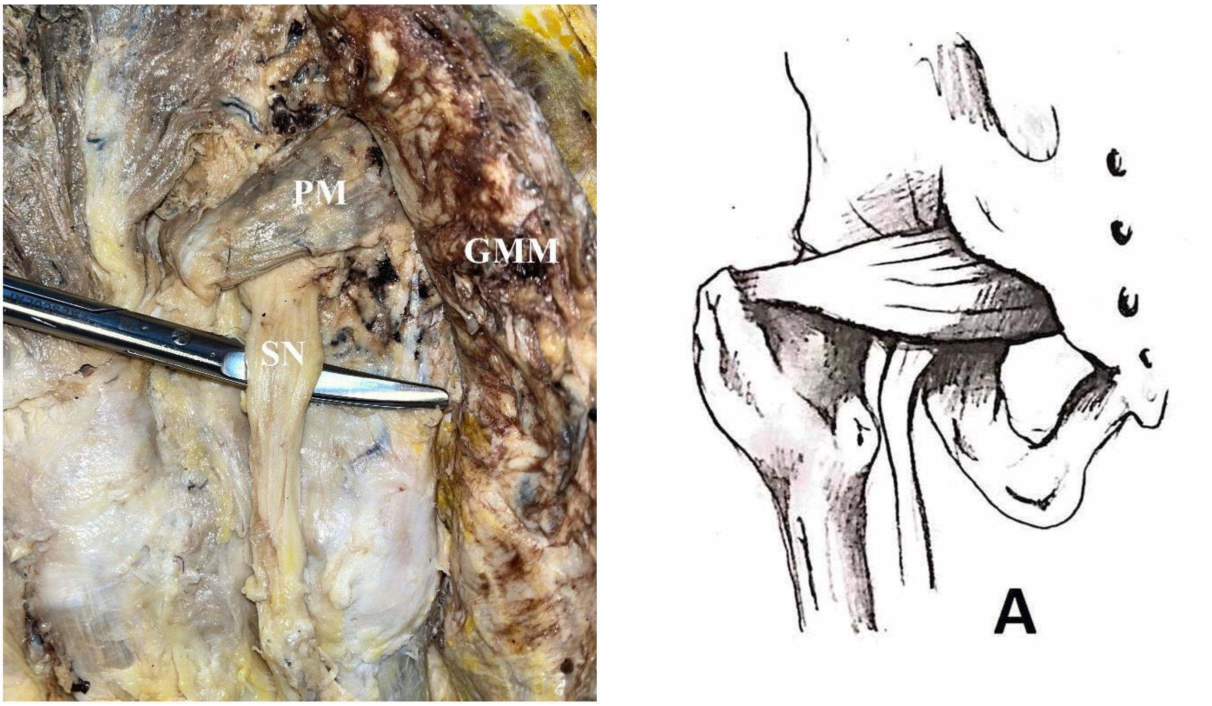

Figure 4: Type A classification of sciatic nerve variation. SN travels below the PM.

SN – Sciatic Nerve; PM – Piriform Muscle; GMM – Gluteus Maximus Muscle

	A	B	C	D	E	F	G
Male	7	0	0	0	0	0	0
Female	6	3	0	0	0	0	1

Table 1: Sciatic nerve variations using the adjusted Beaton and Anson classification created for this study (Figure 2). Male and female cadavers in relation to variations on separate limbs.

	A	B	C	D	E	F	G
Left Side	15	1	0	0	0	0	0
Right Side	15	2	0	0	0	0	1

Table 2: Sciatic nerve variations using the adjusted Beaton and Anson classification created for this study (Figure 2). Left and right sides of cadavers in relation to variations on separate limbs.

	Male	Female
1	7	6
2	0	0
3	0	3
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
NA	0	1

Table 3: Sciatic nerve variations using the 13 type Ana Beatriz Marques Barbosa classification (Figure 3). Male and female cadavers in relation to variations on separate limbs.

NA – not applicable.

	Right side	**Left side**
1	15	15
2	0	0
3	2	1
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
NA	1	0

Table 4: Sciatic nerve variations using the 13 type Ana Beatriz Marques Barbosa classification (Figure 3). Left and right sides of cadavers in relation to variations on separate limbs.

NA – not applicable.

Three (8.82%) of the variations presented with the common peroneal nerve traveling through the piriformis muscle forming two bellies and the tibial nerve traveling below the piriformis muscle (Figure 5; Figure 6; Figure 7; i.e.,Type B according to Beaton and Anson and Type 3 according to Barbosa). One (2.94%) variation was found that could not be applied to any of the used classifications; i.e., it was a newly discovered and unknown anatomical variant that does not appear in both the Beaton and Anson and Barbosa classifications. In this variant, the tibial division of sciatic nerve travels underneath the piriformis muscle and the common peroneal division travels through the piriformis muscle. Additionally, the common peroneal nerve presents a supplementary small branch which travels through the piriformis muscle as well and joins the common peroneal nerve, thus splitting the piriformis muscle into three bellies (Figure 8). For the purpose of this study, we describe this variation as “Type G”, i.e., as an addition to the Beaton and Anson classification (Figure 9). Several other anatomical variants were not found in the present study, specifically variation types C, D, E, and F according to Beaton and Anson and variation types 2, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 13 according to Barbosa.

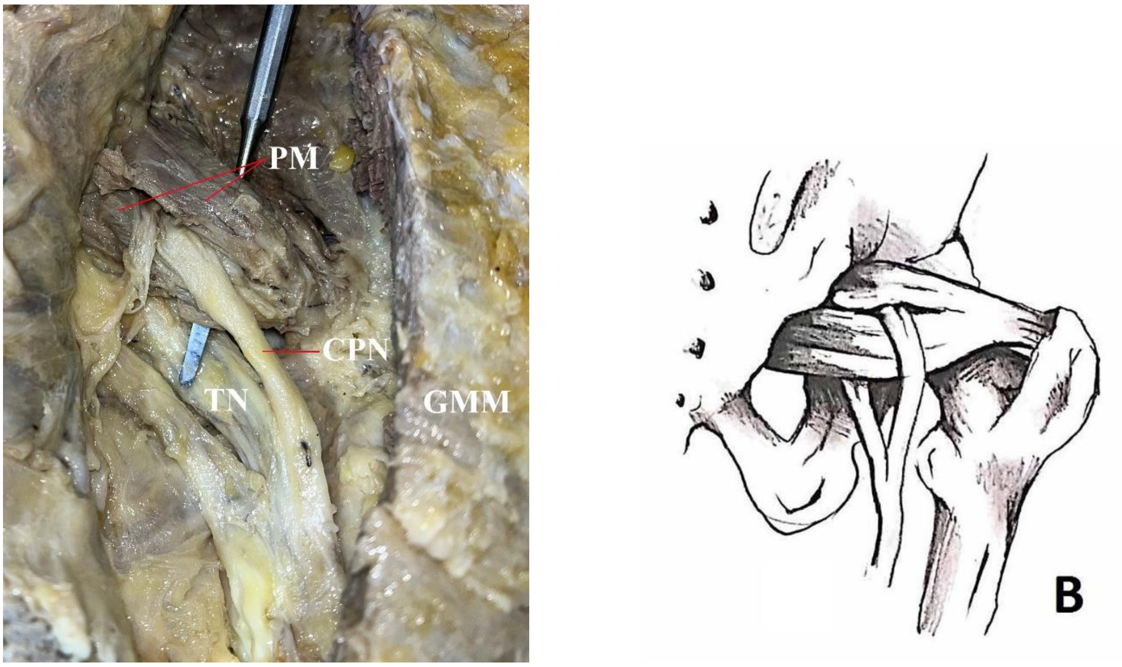

Figure 5: Type B classification of sciatic nerve variations. TN travels below the PM and CPN above the PM

TN – Tibial Nerve; CPN – Common Peroneal Nerve; PM – Piriform Muscle; GMM = Gluteus Maximus Muscle.

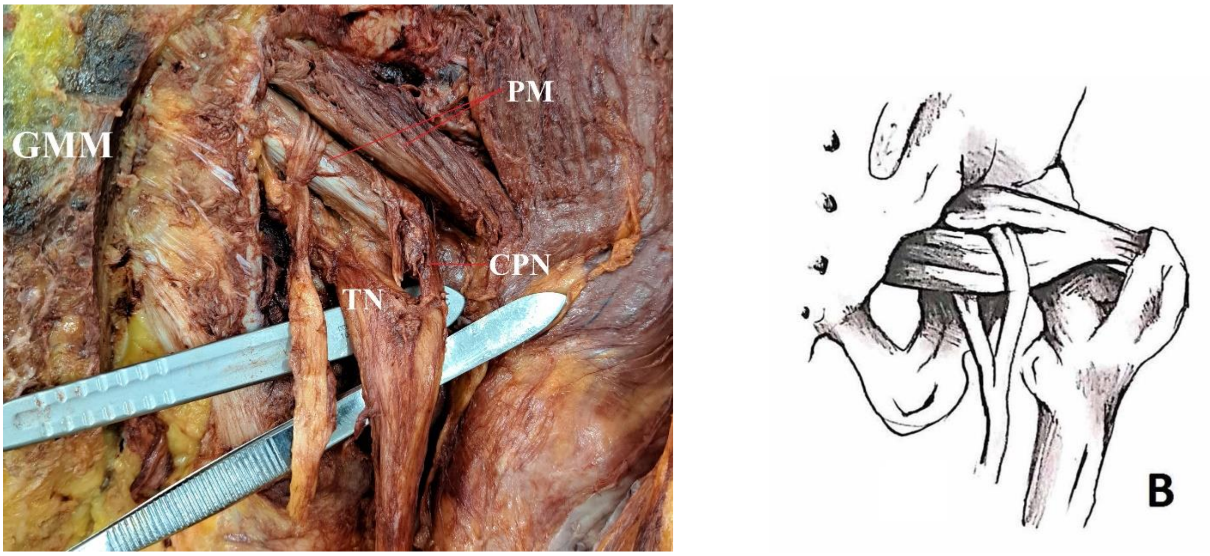

Figure 6: Type B classification of sciatic nerve variations. TN travels below the PM and CPN above the PM

TN – Tibial Nerve; CPN – Common Peroneal Nerve; PM – Piriform Muscle; GMM = Gluteus Maximus Muscle.

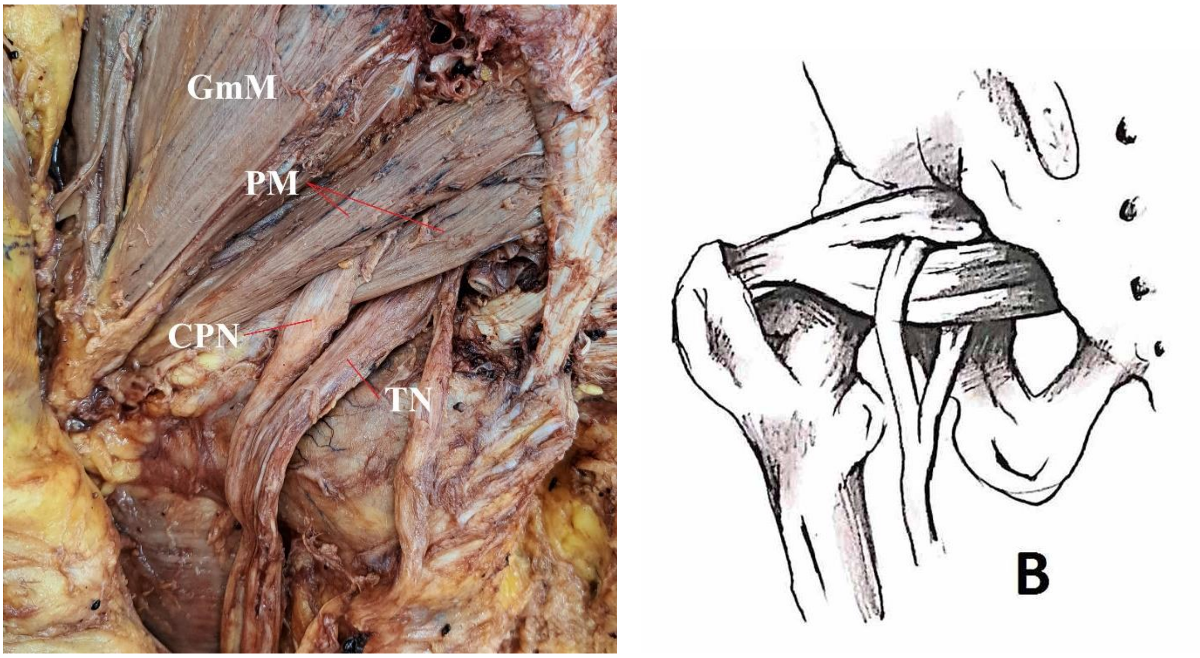

Figure 7: Type B classification of sciatic nerve variations. TN travels below the PM and CPN above the PM

TN – Tibial Nerve; CPN – Common Peroneal Nerve; PM – Piriform Muscle; GmM = Gluteus medius Muscle.

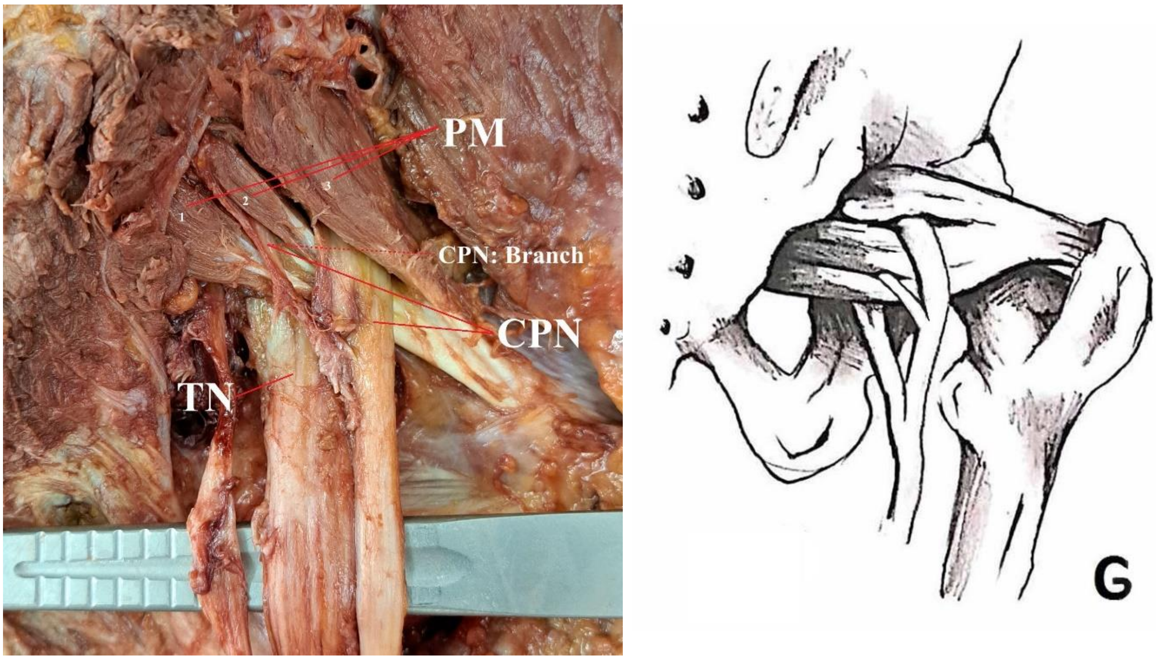

Figure 8: Suggested new Type G classification of sciatic nerve variation from the adjusted model. The variation has the TN traveling underneath the PM and the CPN traveling through the PM, additionally the CPN has a small branch which travels through the PM as well and joins the common peroneal nerve, this structure splits the piriform muscle into three bellies (Numbered 1, 2, 3).

Figure 9: Newly discovered "Type G"

Type G – the TN travels below the PM and CPN divides into two branches splitting the PM into three distinct separate bellies. TN – Tibial Nerve; PM – Piriform muscle; CPN – Common Peroneal Nerve.

Discussion:

The sciatic nerve is the longest and thickest nerve in the human body, playing a pivotal role in lower limb innervation. Despite its crucial function, variability in its anatomical presentation has been extensively documented, presenting challenges not only in terms of classification but also in the clinical practice, particularly during surgical interventions and diagnostic procedures. Such variations encompass differences in the nerve's origin, course, branching patterns, and relationships with adjacent structures. Understanding these anatomical nuances is imperative for clinicians to accurately interpret diagnostic imaging, in order to effectively plan surgical approaches and mitigate potential complications of invasive procedures. This discussion aims to elucidate the spectrum of sciatic nerve variations reported in the literature, highlighting their clinical implications and providing insights into navigating these complexities in medical practice.

More specifically, the relationship between the sciatic nerve and the piriformis muscle is of particular interest due to its clinical implications, notably in the context of deep gluteal pain and piriformis syndrome. In a subset of individuals, the sciatic nerve may exhibit variations in its course, leading it to pass through or alongside the piriformis muscle rather than beneath it. This anatomical variation, known as "anatomic piriformis syndrome," can predispose individuals to compression of the sciatic nerve, resulting in symptoms such as deep gluteal pain, radiating discomfort down the posterior thigh, and even sensory or motor deficits in the lower limb.

In this cadaver study, most of the limb specimens (88%) showed normal anatomy of the sciatic nerve in relation to the piriformis muscle (i.e., type A according to the Beaton and Anson classification) and 12% of the specimens presented with already described variations.

However, one specimen (2.94%) showed a very rare anatomical variation where the tibial division of sciatic nerve travels underneath the piriformis muscle and the common peroneal division travels through the piriformis muscle. Additionally, the common peroneal nerve presents a supplementary small branch which travels through the piriformis muscle as well and joins the common peroneal nerve, thus splitting the piriformis muscle into three bellies (Figure 9). This anatomical variant does not fall into any of the previously described types, suggesting that the sciatic nerve may exhibit higher anatomical variability than previously reported. This new variant could be included in the old Beaton and Anson classification specifically as a “Type G” (Figure 2) variant. Interestingly, this study observed that exclusively female cadavers exhibited non-standard variations in sciatic nerve anatomy. The proximity of the sciatic nerve development to the female reproductive system (16) could be explored as a potential explanation for the higher likelihood of non-standard anatomical variations occurring in females (9).

Comparison with previous studies

The present results correlate to previously performed studies, where the predominant type is Type A always followed by second most common Type B (Table 5), according to Beaton and Anson classification.

Author	Year of publication	Sample size	Type A	Type B	Type C	Type D	Type E	Type F	*Type G	Total variation count
Beton and Anston (USA) (10)	1937	240	216 (90%)	17 (7.08%)	5 (2.08%)	2 (0.83%)	-	-	-	24 (10%)
Pecina (Croatia) (11)	1979	130	102 (79.46%)	27 (20.76%)	1 (0.76%)	-	-	-	-	28 (21.53%)
Chiba (Japan) (13)	1992	511	328 (64.18%)	173 (33.85%)	10 (1.96%)	-	-	-	-	183 (35.81%)
Pokorny (Czech Republic) (12)	1988	51	41 (80.39%)	7 (13.72%)	2 (39.21%)	1 (1.96%)	-	-	-	10 (19.60%)
Urgenovic (Serbia) (14)	2005	200	192 (96%)	5 (2.5%)	3 (1.5%)	-	-	-	-	8 (4%)
Lewis (USA) (15)	2016	102	90 (88.24%)	9 (8.82%)	3 (2.94%)	-	-	-	-	12 (11.76%)
Present study	2024	34	30 (88.24%)	3 (8.82%)	-	-	-	-	1 (2.94%)	4 (11.76%)

Table 5: Systematic review of literature on sciatic nerve anatomical variations. Variations are classified using the adjusted Beton and Anson classification model designed for this research study (Figure 2).

*Type G – Newly discovered anatomical variation.

Beaton and Anson have done a similar cadaver study in 1937 (USA), they dissected 240 limb specimens and found that 216 (90%) are categorized as Type A, followed by 17 (7.08%) specimens as Type B, 5 (2.08%) specimens as Type C, 2 (0.83%) as Type D, while Type E and Type F were not found. Out of 240 specimens, 24 (10%) were with non-standard variations (11).

A cadaver study was conducted by Pecina in 1979 and dissection of 130 specimens was done: 102 (79.46%) specimens were categorized as Type A, 27 (20.76%) specimens as Type B, 1 (0.76%) specimen as Type C, while Type D, Type E, and Type F were not found. Out of 130 specimens, 28 (21.53%) displayed variations (12).

Chiba made a cadaver study in 1992 (Japan) dissecting 511 specimens: 328 (64.18%) specimens were categorized as Type A, 173 (33.85%) as Type B, 10 (1.96%) as Type C, while Type D, Type E, and Type F were not found. Out of 511 specimens, 183 (35.81%) were with variations (13).

Pokorny et al. has performed a cadaver study with 51 specimens in 1998 (Czech Republic): 41 (80.39%) specimens were categorized as Type A, 7 (13.72%) specimens as Type B, 2 (39.21%) specimens as Type C, 1 (1.96%) specimen as Type D, while Type E and Type F were not found. Out of 51 specimens, 10 (19.60%) were with variations (14).

Cadaver study conducted by Ugrenovic in 2005 (Serbia) dissected 200 limb specimens: 192 (96%) specimens were categorized as Type A, 5 (2.5%) specimens as type B, 3 (1.5%) specimens as Type C, while Type D, Type C, and Type F were not found. Out of 200 specimens, 8 (4%) were found with variations (15).

Lewis made a cadaver study in 2016 (USA) including 102 limb specimens: 90 (88.24%) were categorized as Type A, 9 (8.82%) specimens as Type B, 3 (2.94%) specimens as Type C, while Type D, Type E, and Type F were not found. Out of 102 specimens, 12 (11.76%) were with anatomical variation (5). This study completely matches the percentual statistics with the results of this presented cadaver study (Table 5), the only difference that in Lewis's study there is a 2.94% of Type C occurrence while in this study 2.94% is visible with the newly found Type G.

Clinical significance:

The correlation between the sciatic nerve and the piriformis muscle is a subject of significant clinical interest due to its implications for conditions such as piriformis syndrome and deep gluteal pain. Anatomical variants in the relationship between these structures can predispose individuals to compression of the sciatic nerve, leading to symptoms characteristic of piriformis syndrome, including deep gluteal pain, radiating discomfort along the posterior thigh, and sensory or motor deficits in the lower limb. Studies have reported various anatomical configurations, including the sciatic nerve passing through, alongside, or beneath the piriformis muscle. While the precise prevalence of piriformis syndrome remains debated, it is estimated to affect a significant proportion of the population, particularly among individuals engaging in activities that place repetitive strain on the piriformis muscle, such as long-distance running or prolonged sitting. Understanding the complex interplay between anatomical variants of the sciatic nerve and the piriformis muscle is crucial for accurate diagnosis and effective management of patients presenting with deep gluteal pain and piriformis syndrome. (3)(4)(5)(6)(7)(17)(18). Evidence of anatomical variations causing piriform syndrome is described in the literature (3)(4)(5)(6)(7)(17)(18) but the actual objectivation of this event in a clinical scenario is very rare. It is thought that anatomical variations where the common peroneal nerve travels through the piriformis muscle (i.e., Type B, D, and the "new" Type G according to Beaton and Anson) have a higher chance of developing piriformis syndrome (12). As guided ultrasound Lidocaine injections are performed to treat piriformis syndrome, knowledge of anatomical variations is crucial for such procedures to avoid injury. Surgical treatment can also be performed to reduce piriformis induced compression. In a case study by Kosukegawa (21), a patient with Type D sciatic nerve variation classification has undergone piriformis muscle resection with the anterior and posterior muscle bellies removal. After two years the patient presented with complete pain relief with no recurrence of piriformis syndrome (21).

Accurate knowledge of sciatic nerve variation is also very important in hip surgery (and particularly hip arthroscopy) to avoid any iatrogenic nerve injury. During this procedure using the posterior approach, the nerve is very prone to be exposed to many traction forces. Knowledge that the sciatic nerve can have different variations can be very important for surgeons to avoid any injury while using tools such as retractors (9) (14) (5).

Study limitations

The main limitation of this study was the small sample size. The limited cadaver population used in this research prevents drawing comprehensive conclusions on a larger scale. Nevertheless, a discernible pattern aligns with existing literature, indicating that female limb specimens are more prone to displaying Type B or other variations (9) (2). With a limited sample size, the generalizability of results becomes compromised, and it becomes challenging to draw robust conclusions applicable to diverse populations. Furthermore, the absence of medical history data for the cadavers introduces another layer of limitation, as the study lacks crucial insights into potential influencing factors or pre-existing conditions and pain. The interpretation of findings must be approached with caution, recognizing the constraints imposed by the restricted sample size and the absence of comprehensive medical background information.

Conclusion

The obtained results closely align with existing literature, confirming the prevalence of Type A variant according to Anson and Beaton as the most common and standard configuration of the sciatic nerve. Type B was identified as the subsequent common variation, illustrating a split sciatic nerve with one division passing beneath the piriformis muscle and the other penetrating the piriformis muscle, forming two distinct bellies. However, this study describes a new variation at the sciatic-piriformis junction which is not mentioned in any of the existing classifications, underscoring the importance of ongoing anatomical research to broaden our understanding of anatomical variations in this intricate region. Understanding anatomical variations is crucial across medical disciplines and clinicians must be vigilant in recognizing these variations during both diagnostic evaluations and surgical interventions, as misinterpretation or oversight may lead to ineffective treatment strategies or inadvertent nerve injury. Understanding the intricate relationship between the sciatic nerve and the piriformis muscle is therefore paramount for accurate diagnosis and management of conditions such as deep gluteal pain or piriformis syndrome.

References :

1. Tunstall R. SS. Gray’s anatomy: The anatomical basis of Clinical Practice. 42nd ed. Elvesier; 2021.

2. Giuffre BA, Black AC, Jeanmonod R. Anatomy, Sciatic Nerve. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 [cited 2024 Mar 28]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK482431/

3. Cass SP. Piriformis Syndrome: A Cause of Nondiscogenic Sciatica. Curr Sports Med Rep. 2015 Jan;14(1):41.

4. Jha AK, Baral P. Composite Anatomical Variations between the Sciatic Nerve and the Piriformis Muscle: A Nepalese Cadaveric Study. Case Rep Neurol Med. 2020 Mar 31;2020:e7165818.

5. Lewis S, Jurak J, Lee C, Lewis R, Gest T. Anatomical variations of the sciatic nerve, in relation to the piriformis muscle. Transl Res Anat. 2016 Dec 1;5:15–9.

6. Atoni AD, Oyinbo CA, Francis DAU, Tabowei UL. Anatomic Variation of the Sciatic Nerve: A Study on the Prevalence, and Bifurcation Loci in Relation to the Piriformis and Popliteal Fossa. Acta Medica Acad. 2022 Dec 16;51(1):52–8.

7. Ro TH, Edmonds L. Diagnosis and Management of Piriformis Syndrome: A Rare Anatomic Variant Analyzed by Magnetic Resonance Imaging. J Clin Imaging Sci [Internet]. 2018 Feb 21 [cited 2024 Mar 28];8. Available from: https://clinicalimagingscience.org/diagnosis-and-management-of-piriformis-syndrome-a-rare-anatomic-variant-analyzed-by-magnetic-resonance-imaging/

8. Michel F, Decavel P, Toussirot E, Tatu L, Aleton E, Monnier G, et al. The piriformis muscle syndrome: An exploration of anatomical context, pathophysiological hypotheses and diagnostic criteria. Ann Phys Rehabil Med. 2013 May 1;56(4):300–11.

9. Cureus | Sciatic Nerve Variants and the Piriformis Muscle: A Systematic Review and Meta-Analysis | Article [Internet]. [cited 2024 Mar 28]. Available from: https://www.cureus.com/articles/45037-sciatic-nerve-variants-and-the-piriformis-muscle-a-systematic-review-and-meta-analysis#!/

10. Barbosa ABM, Santos PV dos, Targino VA, Silva N de A, Silva YC de M, Gomes FB, et al. Sciatic nerve and its variations: is it possible to associate them with piriformis syndrome? Arq Neuropsiquiatr. 2019 Sep 23;77:646–53.

11. Beaton LE, Anson BJ. The relation of the sciatic nerve and of its subdivisions to the piriformis muscle. Anat Rec. 1937;70(1):1–5.

12. Pećina M. Contribution to the etiological explanation of the piriformis syndrome. Acta Anat (Basel). 1979;105(2):181–7.

13. Chiba S. [Multiple positional relationships of nerves arising from the sacral plexus to the piriformis muscle in humans]. Kaibogaku Zasshi. 1992 Dec;67(6):691–724.

14. Pokorný D, Sosna A, Veigl P, Jahoda D. [Anatomic variability of the relation of pelvitrochanteric muscles and sciatic nerve.]. Acta Chir Orthop Traumatol Cech. 1998;65(6):336–9.

15. Ugrenović SZ, Jovanović ID, Krstić V, Stojanović VR, Vasović LP, Antić S, et al. The level of the sciatic nerve division and its relations to the piriform muscle. Vojnosanit Pregl. 2005;62(1):45–9.

16. Sulak O, Sakalli B, Ozguner G, Kastamoni Y. Anatomical relation between sciatic nerve and piriformis muscle and its bifurcation level during fetal period in human. Surg Radiol Anat. 2014 Apr 1;36(3):265–72.

17. Kraus E, Tenforde AS, Beaulieu CF, Ratliff J, Fredericson M. Piriformis Syndrome With Variant Sciatic Nerve Anatomy: A Case Report. PM&R. 2016;8(2):176–9.

18. Anatomical variations between the sciatic nerve and the piriformis muscle: a contribution to surgical anatomy in piriformis syndrome | Surgical and Radiologic Anatomy [Internet]. [cited 2024 Mar 28]. Available from: https://link.springer.com/article/10.1007/s00276-013-1180-7

19. Papadopoulos EC, Khan SN. Piriformis syndrome and low back pain: a new classification and review of the literature. Orthop Clin North Am. 2004 Jan 1;35(1):65–71.

20. Aquino-Jose VM, Blinder V, Johnson J, Havryliuk T. Ultrasound-guided trigger point injection for piriformis syndrome in the emergency department. J Am Coll Emerg Physicians Open. 2020;1(5):876–9.

21. Kosukegawa I, Yoshimoto M, Isogai S, Nonaka S, Yamashita T. Piriformis Syndrome Resulting From a Rare Anatomic Variation. Spine. 2006 Aug 15;31(18):E664.

Extras:

Cadaver consent form:

Vilniaus universiteto
Medicinos fakulteto
Anatomijos, histologijos ir antropologijos katedros vedėjai
(tel. nr. (8-5) 239 87 07)

Aš, (vardas, pavardė, asmens kodas, LR paso arba tapatybės kortelės numeris), pageidauju, kad man mirus mano palaikai būtų panaudoti mokslo ir mokymo tikslu ir būtų perduoti Vilniaus universiteto Medicinos fakulteto Anatomijos, histologijos ir antropologijos katedrai neribotam laikotarpiui (arba bet kokiam kitam laikotarpiui – nuo 1 metų). Šį pageidavimą išreiškiu laisva valia, neturėdamas jokių kitų motyvų, išskyrus norą padėti Lietuvos medicinos mokslui bei Lietuvos gydytojų mokymui. (Ne)prieštarauju, kad mano vidaus organai būtų panaudoti studijų tikslams (preparatams). Pageidauju, kad mano mirties dieną arba dieną po jos, palaikus pasiimtų iš artimųjų Vilniaus universiteto Medicinos fakulteto Anatomijos, histologijos ir antropologijos katedra. Kai palaikai nebebus naudojami mokslo tikslams, pageidauju, kad mano palaikai būtų kremuoti. Pageidauju, kad urna su mano pelenais liktų Vilniaus universitete tam tikslui skirtose universiteto kapinėse (arba perduota artimiesiems – nurodyti kontaktus). Sutinku, kad mano giminaičiams, jų pageidavimu, būtų suteikta informacija apie mano palaikų panaudojimą mokslo tikslams, kremavimą ir patalpinimą Vilniaus universitete tam tikslui skirtose kapinėse. (Ne)pageidauju, kad mano vardas ir pavardė būtų minimi antkapio lentoje. Pageidauju, kad kūno transportavimo ir kremavimo išlaidas padengtų Vilniaus universiteto Medicinos fakulteto Anatomijos, histologijos ir antropologijos katedra. (Ne)pageidauju, kad laikant mišias, būtų minimas mano vardas. Pareiškimas garsiai perskaitytas, suprastas dėl turinio bei pasekmių ir, kaip atitinkantis mano valią, pasirašytas.

Vardas, pavardė, parašas