



Anatomical Locations in the Lower Limb that Correlate with the Basic Massage Lines and Signaling Points of Court Type Thai Traditional Massage

Narongsak Chantawang*, Nootchanat Mairuae, Reon Somana

Abstract

Court type Thai Traditional Massage (CTTM) involves the use of hands and fingers to press on massage points, Signaling Points (SPs) and Basic massage Lines (BLs). The authors sought to identify the anatomical locations, from superficial to deeper layers of soft tissues, that corresponded to BLs and SPs in the lower limb. By using bimanual palpation of the body surface of two volunteers and dissecting 10 lower limbs, it was found that the massage points correspond to the muscular origins and the proximal parts of arteries penetrating through the muscles and to the nerves ramifying to supply the muscles. SPs are along the muscular origins where the artery and nerve branches supplying them (motor points) are found. Both massage points and SPs are found along the border of the iliotibial tract, where the arteries and nerves enter the muscles and associate with the hip joints. BLs correspond to the longitudinal arrangement of muscles from the origins to the tendons, the borders of the iliotibial tract, the artery and nerves between the muscles, and the dorsal veins of foot. In conclusion, the massage points and lines of CTTM always associate or closely relate to anatomical structures, especially arteries, nerves and muscles.

Key words: Court type Thai Traditional Massage, Basic massage Lines, Signaling Points

Background

Thai Traditional Medicine (TTM) is a mode of health care practice that is congruent with Thai culture and way of life according to the principles of Buddhism. TTM is com-

posed of Thai therapeutic medicine, Thai therapeutic pharmacy, Thai therapeutic Massage (TM) and Thai therapeutic midwifery. TM or Nuad-Thai is a branch of TTM. It is a form of manual therapy that can effectively cure or relieve several symptoms and diseases. There are two types of TM, namely, Folk massage and Court type Thai traditional

Faculty of Medicine, Mahasarakham University, Nakhon Sawan Road, Maha Sarakham 44000, Thailand

*Corresponding author: reon.s@msu.ac.th

Received date 01/05/15 ■ Accepted date 21/05/15

massage (CTTM). CTTM emphasizes the use of hands and fingers to apply pressure to the points and along the BLs¹⁻⁵. BLs comprise basic massage lines on the lower limbs (outer and inner legs). SPs are important spots or locations on the human body for treatment purposes in CTTM practice, and correspond to Sen-Sib or the ten (sib) primary energy lines (sen) which have been believed to regulate blood flow and distribute blood and heat throughout the body. There are 50 SPs in the whole body where 10 SPs are located in the lower limbs¹⁻⁵. Treatment with CTTM involves four steps, namely 1) massage on BLs, 2) massage on SPs, 3) basic therapeutic massage, and 4) symptom-specific therapeutic massage. Of which, steps 1 and 2 are important. Massage therapists should have basic knowledge of human anatomy given it is the essential requirement of massage training for accurately identifying BLs, SPs as well as symptom-specific massage¹⁻⁵.

However, the studies on TM associated with anatomical structure are relatively limited. It is important for health professionals to clearly understand about massage points along the BLs and SPs and their associated organs of the body. This study focuses on lower limbs given they are major sites for therapeutic massages which involve many important body parts and organs.

The objective of this study was to find

out the anatomical structure in the lower limbs that correlate with BLs and SPs of the Court Type Thai Traditional Massage (CTTM).

Methodology

This study was conducted in the Anatomy Laboratory Room (ALR) Faculty of Medicine, Mahasarakham University, Thailand. The study was approved by the Ethics Committee of Mahasarakham University (Ref. no 208/2015)

Two healthy volunteers comprising one man (aged 28 years, height 175 cm., body weight 65 kg.) and one woman (aged 24 years, height 160 cm., body weight 50 kg.) were included in this study. This study also involved with five cadavers (61-75 years, males=3: height 168-175 cm., females=2: height 158-165 cm.) available for medical studies in the ALR of the Faculty of Medicine, Mahasarakham University. Ten lower limbs were dissected in the ALR. This study was carried out during January through May, 2015. Massage points, SPs and BLs were located and marked on the volunteers and cadavers by one researcher who was a licensed Thai massage therapist.

The cadavers were dissected by the researchers following laboratory guideline based on the Cunningham' Manual of Practical Anatomy. All study anatomical structures were verified by one of the researcher who

was an anatomist and medical doctor.

The massage points of the lower limb comprise the Nakabath Points numbers 1 and 2 (NP1 and NP2), Perd Pra Too Loom Point or Temporary Artery Occlusion Point (TAOP), Outer Signaling Points numbers 1 to 5 (OSP1, OSP2, OSP3, OSP4 and OSP5) and Inner Signaling Points numbers 1 to 5 (ISP1, ISP2, ISP3, ISP4 and ISP5). They are divided into:

1) Massage points NP1, NP2 and TAOP (Figure 1)

NP1 is the point where a vertical line passing through the lateral edge of the patella intersects with a horizontal line passing approximately 2 fingerbreadths (4 cm.) below the lower part of the patella, while NP2 is approximately one fingerbreadth below NP1 (Figure 1).

TAOP is the point where an oblique line passes through the Anterior Superior Iliac Spine (ASIS or Huatakak in Thai) at an angle of approximately 45° (Figure 1).

2) Signaling points OSP4, OSP5, ISP1, ISP2, ISP3 and ISP5

OSP4 is the point where an imaginary vertical line and horizontal line intersect. The vertical line passes through the tendons on the lateral side of the knee, while the horizontal line passes approximately 4 fingerbreadths (8 cm.) above the tendons on the lateral side of the knee (Figure 4).

OSP5 is the point where an imaginary

vertical line and horizontal line intersect. The vertical line passes approximately 1 fingerbreadth (2 cm.) anterior to the fibular head, whereas the horizontal line passes approximately 4 fingerbreadths (8 cm.) below the fibular head (Figure 4).

ISP1 is the intersecting point of a vertical line passing approximately 3 fingerbreadths (6 cm.) posterior to the midline of the inner thigh with a horizontal line drawn adjacent to the gluteal fold (Figure 5).

ISP2 is the intersecting point of a vertical line passing through the midline of the inner thigh with a horizontal line drawn 2 fingerbreadths (4 cm.) below the gluteal fold on the inner side of the thigh (Figure 5).

ISP3 is the intersecting point of a vertical line passing approximately 1 fingerbreadth (2 cm.) anterior to the midline of the inner thigh with a horizontal line drawn 4 fingerbreadths (8 cm.) above the patella on the inner side of the thigh (Figure 5).

ISP5 is the intersecting point of a vertical line passing adjacent to the posterior border of the medial malleolus with a horizontal line drawn adjacent to the lower border of the medial malleolus (Figure 5).

3) Points that are considered to be both massage points and SPs include OSP1, OSP2, OSP3 and ISP4.

OSP1 is the point where an imaginary vertical and horizontal line intersect. The ver-

tical line passes through the highest point of the iliac crest which is approximately 5 fingerbreadths (10 cm.), whereas the horizontal line passes through the ASIS (Figure 2).

OSP2 is the point where an imaginary vertical line and horizontal line intersect. The vertical line passes through the posterior point of the ASIS which is approximately 2 fingerbreadths (4 cm.), whereas the horizontal line passes through the anteroinferior point of the ASIS which is approximately 1 fingerbreadth (2 cm.) (Figure 2).

OSP3 is the point where an imaginary oblique line and horizontal line intersect. The oblique line passes through the ASIS at an angle of approximately 45° , whereas the horizontal line passes through the coccyx (Figure 2).

ISP4 is the middle point of the knee joint and lies behind the knee (Figure 3).

BLs of the lower limb comprise Basic Line numbers 1 to 4 (BL1, BL2, BL3 and BL4), Instep Lines (ILs), Basic Line of Outer Thigh (BLOT), Basic Line of Outer Leg (BLOL), Basic Line of Inner Thigh (BLIT), and Basic Line of Inner Leg (BLIL).

BL1 is an imaginary line drawn from approximately one fingerbreadth (2 cm.) anteromedial to NP2 down to the anteromedial border of the lateral malleolus (Figure 1).

BL2 is an imaginary line drawn approximately 2 fingerbreadths (4 cm.) superolateral

to the border of the patella up to the ASIS (Figure 1).

BL3 is an imaginary line drawn from approximately 5 fingerbreadths (10 cm.) below the ASIS down to the upper lateral part of the patella approximately 2 fingerbreadth (4 cm.) (Figure 1).

BL4 is an imaginary line drawn from approximately 1 fingerbreadth (2 cm.) below the fibular head to the lateral border of the lateral malleolus (Figure 1).

ILs are imaginary lines drawn from the fifth metatarsal to the medial border of the foot (Figure 1).

BLOT is an imaginary line drawn from approximately 5 fingerbreadths (10 cm.) below OSP3 to the upper part of the lateral side of the patella (Figure 2).

BLOL is an imaginary line drawn from the anterior border of the fibular head which is approximately 1 fingerbreadth (2 cm.) to the anterior border of the lateral malleolus (Figure 2).

BLIT is an imaginary line drawn from



Figure 1 Anterolateral aspect of the left lower limb showing the locations of NP1 (1), NP2 (2), BL1 (1a to 1b), BL2 (2a to 2b), BL3 (3a to 3b), BL4 (4a to 4b), ILs and TAOP (x).



Figure 2 Lateral aspect of the right lower limb showing the locations of OSP1 (OSP1), OSP2 (OSP2), OSP3 (OSP3), BLOT (x' to y') and BLLOL (a' to b').

approximately 2 fingerbreadths (4 cm.) below the gluteal fold to 2 fingerbreadths (4 cm.) above the medial side of the medial epicondyle of the femur (Figure 4).

BLIL is an imaginary line drawn from the medial border of the tibia, approximately 2 fingerbreadths (4 cm.) below the tibia head, to 2 fingerbreadths (4 cm.) posterior to the border of the medial malleolus (Figure 4).

All of these structures were identified and palpated by removing skin and fascia from the buttocks, thighs, legs and feet of the dissection cadavers. Anatomical structures especially, muscles, nerves, blood vessels and other structures located at or deep to the massage points, SPs and BLs were identified and photographs were taken of these structures.

Results

The lateral border of tibia could be palpated adjacent BL1 in the living person. Removal of the skin over BL1 showed that it



Figure 3 Medial aspect of the left lower limb showing the locations of BLIT (x'' to y''), ISP4 (ISP4) and BLIL (a'' to b'').



Figure 4 Lateral aspect of the right lower limb showing the locations of OSP4 (OSP4) and OSP5 (OSP5).

was located between the origins and the tendons of the Tibialis Anterior (TA) and Extensor Digitorum Longus (EDL) muscles. Deeper dissection at the middle third of BL1 indicated the Anterior Tibial vessels and the Deep Peroneal Nerve (DPN) to be between these muscles (Figure 6). At BL2 and BL3 runs along the border of Iliotibial Tract (IT) could be palpated in the living person. After removing the thigh skin, it is found that the BL2 and BL3 locates along the anterior and posterior borders of the IT. The posterior border of fibular could be palpated along BL4 in the living person. After removing the leg skin, it could be mapped that the BL4 occupied by the ori-

gins to the tendons of Peroneus Longus (PL) and Peroneus Brevis (PB) muscles, where the Superficial Peroneal Nerve (SPN) ramifies to supply these muscles (Figure 6). The tendons and the Dorsalis Pedis Arterial pulse could be palpated along ILs in the living person. After removing the dorsal of foot skin, it is found that, ILs locates on the area where the dorsal veins of foot, the tendons, the SPN where the DPN ramifying to supply the muscles and the dorsalis pedis artery is continuation of the Anterior Tibial Artery to supply the contents of the dorsum of foot. The



Figure 5 Medial aspect of the left lower limb showing the locations of ISP1 (ISP1), ISP2 (ISP2), ISP3 (ISP3) and ISP5 (ISP5).



Figure 6 Deeper dissection of the right leg showing the anatomical structures that are associated with NP1 (I), NP2 (II) and BL1 (Ia to Ib). EDL, extensor digitorum longus muscle; PL, peroneus longus muscle; TA, tibialis anterior muscle; a, lateral edge of the patella; b, lower part of the patella.

posterior border of the IT could be palpated along BLOT in the living person and was confirmed by removing the thigh skin in the cadaver. The proximal part of BLOT was seen along the insertion of the Gluteus Maximus (GMax) to the posterior border of the IT and the Short head of Biceps Femoris (SBF) muscle. It was related to the distal part of this line. In the living specimen could be palpated at BLOL runs along the lateral border of tibia and was confirmed by removing of the leg skin in the cadaver. This line was seen along the anterior border of fibula and between the origins to the tendons of TA and EDL muscles (Figure 6). In the middle third of this line, the Anterior Tibial vessels and the Deep Peroneal Nerve (DPN) were seen between the TA and EDL muscles. The anterior border of Gracilis muscle could be palpated along BLIT in the living person and was confirmed by removing the thigh skin in the cadaver. BLIT was seen along the anterior border of the Gracilis muscle and the posterior border of the Sartorius muscle. Deeper dissection at the middle third of BLIT revealed that the Femoral vessels and Femoral Nerve (FN) are located under the Sartorius muscle. The medial border of tibia could be palpated adjacent BLIL in the living person and was confirmed by removing the leg skin in the cadaver. BLIL was located along the medial border of the Gastrocnemius and

Soleus muscles, with the Posterior Tibial vessels and Tibial Nerve (TN) then seen under the Flexor Digitorum Longus (FDL) muscle.

The lateral border of tibia could be palpated adjacent NP1 and NP2 in the living person. After removing the skin, it was found that both NP1 and NP2 are located between the origins of the TA and EDL muscles, with the Anterior Tibial vessels seen penetrating through the openings in the interosseous membrane at NP1, and DPN ramifying to supply the muscles at NP2 (Figure 1). At TAOP, the Femoral Arterial pulse could be palpated in the living person and was confirmed by removing the thigh skin in the cadaver. TAOP is in the superior part of the femoral triangle where the Femoral vessels and FN disappear into the adductor canal through the apex of femoral triangle.

The posterior border of IT could be palpated adjacent OSP1 in the living person. Removal of the skin showed that OSP1 corresponds to the anterosuperior border of the GMax muscle at a location adjacent to the posterior border of the IT. It was also superficial to the middle parts of the Gluteus Medius (GMe) and Gluteus Minimus (GMi) muscles. The Superior Gluteal vessels and Superior Gluteal Nerve (SGN) were identified between the GMe and GMi muscles. At OSP2, the fleshy part of Tensor Fascia Latae (TFL) muscle could be palpated in the living speci-

men and was confirmed by removing of the thigh skin in the cadaver. OSP2 is in the vicinity of the posteroinferior border of the ASIS and was at the fleshy part of the TFL muscle. The Superior Gluteal vessels and SGN were seen entering the TFL and supplying it. When dissecting deeper, the Iliofemoral ligament was found to overly the head of the femur in the acetabulum (Figure 7). At OSP3, the central part of GMax muscle could be palpated in the living person and was confirmed by removing of the thigh skin in the cadaver. OSP3 associates with the Inferior Gluteal vessels and Inferior Gluteal Nerve (IGN), which were seen entering the central part of the GMax and supplying it (Figure 8). OSP3 also corresponds to the Posterior Cutaneous Nerve



Figure 7 Deeper dissection of the left thigh and gluteal region showing that the location of OSP2 overlies the femur head in the acetabulum. ASIS, anterior superior iliac spine; GMe, gluteus medius muscle; F, femur head; IT, iliotibial tract; Pi, piriformis muscle; RF, rectus femoris muscle; SGA, superior gluteal artery; SGN, superior gluteal nerve; S, sartorius muscle; X, highest point of the iliac crest.

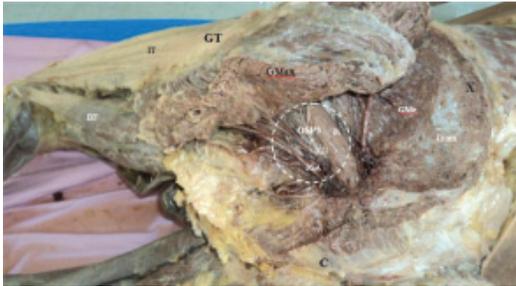


Figure 8 Deeper dissection of the left thigh showing the location of OSP3 in relation to the central part of the gluteus maximus muscle (GMax). Note the inferior gluteal artery (IGA) and the nerve running along the deeper surface of the GMax muscle. BF, biceps femoris muscle; C, coccyx; GMe, gluteus medius muscle; IT, iliotibial tract; Pi, Piriformis muscle; X, highest point of the iliac crest.

of the thigh (PCN) as well as the Sciatic Nerve (ScN) which was seen penetrating the inferior border of the piriformis muscle. At ISP4, the Popliteal Arterial pulse could be palpated in the living person and was confirmed by removing of the skin in the cadaver. ISP4 corresponds to the popliteal fossa that lies behind the knee. Deeper dissection showed the popliteal vessels are under the TN (Figure 9).

In the living specimen, it is the posterior border of IT where the SBF muscle originates could be palpated in the OSP4. After removing the skin, it is seen that between the posterior border of the IT, where the nerve to the SBF muscle was seen entering and supplying it (Figure 10), and the Superior Lateral Genicular artery was seen penetrating



Figure 9 Deeper dissection of the left thigh showing the location of ISP4 in relation to the popliteal vessels under the tibial nerve (TN). BF, biceps femoris muscle; CPN, common peroneal nerve; Gas, gastrocnemius muscle; PA, popliteal artery; SeM, semimembranosus muscle; SeT, semitendinosus muscle.



Figure 10 Left thigh after skin removal showing the location of OSP4 in relation to the posterior border of the iliotibial tract (IT) where the short head of the biceps femoris muscle (SBF) originates and nerves to the SBF are seen entering the SBF and supplying it. LBF, long head of biceps femoris muscle; ScN, sciatic nerve.

from the popliteal artery and anastomoses with the descending branch of lateral circumflex femoral artery to supply the knee joint. At OSP5, the posterior border of TA muscle could be palpated in the living person. After dissecting the leg skin and the deep fascia, it is seen that between the TA and EDL muscles where the Anterior Tibial vessels with DPN descend in front of the interosseous membrane before entering the dorsum of the

foot. At ISP1, the posterior border of Gracilis muscle could be palpated in the living person. After dissecting the thigh skin, it is confirmed that the ISP1 locates between the posterior border of the Adductor Magnus (AM) muscle and the anterior border of the origin of Semimembranosus muscle, at a location where the posterior division of the Obturator Nerve enters the AM muscle. At ISP2 and ISP3, the anterior border of Gracilis muscle could be palpated in the living person. After dissecting the thigh skin, it revealed that the ISP2 and ISP3 are located at the anterior border of the Gracilis muscle and the posterior border of Sartorius muscle, where the Femoral vessels and FN are seen under the Sartorius muscle. The Femoral vessels communicate with the popliteal fossa through the adductor hiatus in the AM muscle. At ISP5, the Posterior Tibial Arterial pulse could be palpated in the living person. After removing the leg skin in the cadavers, this point corresponds to the Posterior Tibial vessels and TN are seen deep to the Flexor Retinaculum.

Discussion

The BLs correspond to the longitudinal arrangement of muscles from the origins to the tendons, in association with the borders of the IT, as well as to the vessels and the nerve supplies between the muscles. One exception is BL2, which corresponds to the

longitudinal arrangement of muscles from the tendons to the origins. The massage points correspond to the muscular origins, to the proximal parts of the artery penetrating through the opening, and to the nerves ramifying to supply the muscles. This was confirmed by pressing NP1 and NP2, which led to diminishing of the dorsalis pedis arterial pulse.

The SPs are located near the muscular origins or between the muscular origins where the arterial and nerve supply are found. They are found adjacent to the courses of arterial and nerve supply namely, ISP2 and ISP3, which run along the direction of the FN and the Femoral vessels and its branches. This was confirmed by showing that pressure on ISP2 and ISP3 diminished the popliteal arterial pulse. One exception was ISP1, which was located near the origin of the Semimembranosus muscle.

The points that are considered to be both massage points and SPs associated with the branches of arteries and nerves entering the muscles, and also with the hip joint. One exception is ISP4, which corresponds to the popliteal fossa where the arterial and nerve supply are found. This point could be confirmed by pressing and detecting a diminished Dorsalis Pedis and Posterior Tibial Arterial pulse. Massage on these points should therefore be undertaken with care in elderly

patients because it may damage the Popliteal artery and lymph nodes.

Conclusions

This study indicated that the SPs and BLs of CTTM are always associated with or closely related to anatomical structures, especially arteries, nerves and muscles. Our study focused on the lower limbs as therapeutic massage is more frequently administered to these parts of the body than other locations. Findings of the present study parallel those of of Melzak⁶, who found a remarkably high degree (71%) of correspondence when correlating acupuncture points with Myofascial Trigger points (MTrPs). Results presented here also agree with those of Eungpinichpong⁷, who reported that the Sen-Sib or the Ten (sib) primary energy lines (sen) correspond to a high degree (70–80%) with the MTrPs.

The findings of this study support the practice of using thumb (s) or hands to apply pressure to these points in Court Type Thai Traditional Massage. Information presented here should be useful in formulating stan-

dard practice guidelines for therapeutic Thai massage.

Acknowledgments

This research was funded by a grant from Mahasarakham University (2013).

References

1. Dictionary of Medical and Pharmaceutical science, Royal Institute of Thailand. 2 nd ed. Bangkok: The War Veterans Organization of Thailand Publishing; 2010. Massage; p. 155. [In Thai].
2. Center of Applied Thai Traditional Medicine. Thai therapeutic massage (Court type Thai traditional massage). Bangkok: Suphawanich publishing; 2003. [In Thai].
3. Center of Applied Thai Traditional Medicine. Thai Traditional Medicine in the Faculty of Medicine Siriraj Hospital. Bangkok: Suphawanich publishing; 2009. [In Thai].
4. Center of Applied Thai Traditional Medicine. Thai therapeutic massage (The basic massage). Bangkok: Suphawanich publishing; 2011. [In Thai].
5. Center of Applied Thai Traditional Medicine. Thai therapeutic massage (The Signaling Points massage). Bangkok: Suphawanich publishing; 2014. [In Thai].
6. Melzak R, Stillwell DM, Fox EJ. Trigger points and acupuncture points for pain: correlations and implications. *Pain*. 1977;3–23.
7. Eungpinichpong W. The ten lines of traditional Thai massage and myofascial trigger points. *Journal of Medical technology and Physical therapy*. 2004;16(1–3):8–13. [In Thai].

บทคัดย่อ

ตำแหน่งทางกายวิภาคในขาที่สัมพันธ์กับเส้นพื้นฐานและจุดสัญญาณของการนวดราชสำนัก
ณรงค์ศักดิ์ จันทะวัง*, นุชนาถ ไหมหรือ, เรือน สมณะ

คณะแพทยศาสตร์ มหาวิทยาลัยมหาสารคาม ถนนนครสวรรค์ ต.ตลาด อ.เมือง จ.มหาสารคาม 44000

*ผู้รับผิดชอบบทความ: roen.s@msu.ac.th

การนวดแผนไทยแบบราชสำนักเน้นการนวดด้วยนิ้วและมือตามจุด จุดสัญญาณ และเส้นพื้นฐาน การวิจัยนี้มีวัตถุประสงค์เพื่อศึกษาตำแหน่งทางกายวิภาคและอวัยวะในขาที่สัมพันธ์กับจุดนวด จุดสัญญาณ และเส้นพื้นฐาน จากส่วนต้นจนถึงส่วนลึก โดยการคลำในคนปกติ 2 ราย และซ้ำแต่ละ 10 ขา ของศพ凍อง 5 ศพ พบว่าตำแหน่งของจุดนวดอยู่บนจุดเกาะต้นของกล้ามเนื้อ บริเวณส่วนต้นของหลอดเลือดและเส้นประสาทกระจายเข้าสู่กล้ามเนื้อ ตำแหน่งจุดสัญญาณอยู่บนจุดเกาะต้นของกล้ามเนื้อ ซึ่งมีหลอดเลือดและประสาททอดผ่าน หรือกระจายเข้าสู่กล้ามเนื้อ ในขณะที่จุดสัญญาณที่เป็นจุดพื้นฐานมักอยู่บริเวณขอบของแผ่นเอ็นด้านข้างต้นขา (iliotibial tract) หรือมัดกล้ามเนื้อ พบแขนงหลอดเลือดและเส้นประสาทเข้าสู่กล้ามเนื้อ และเป็นตำแหน่งข้อต่อของสะโพก ในขณะที่เส้นพื้นฐานมักอยู่บริเวณจุดเกาะต้นไปยังเอ็นของกล้ามเนื้อ หรือบริเวณขอบของแผ่นเอ็นด้านข้างต้นขา พบหลอดเลือดและเส้นประสาทที่อยู่ระหว่างกล้ามเนื้อ จึงสรุปได้ว่า จุดนวด จุดสัญญาณและเส้นพื้นฐานของการนวดราชสำนักมีความเกี่ยวข้องกับโครงสร้างทางกายวิภาคศาสตร์ของมนุษย์ โดยเฉพาะอย่างยิ่ง หลอดเลือด เส้นประสาท และกล้ามเนื้อ

คำสำคัญ: การนวดราชสำนัก, แนวเส้นพื้นฐาน, จุดสัญญาณ