ROENTGEN ANATOMY* III.
A CROSS SECTION ATLAS FOR THE RADIATION THERAPY OF THE CANCER OF CERVIX UTERI.

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子宮癌放射線治療の解剖学的基礎として，以下の研究を行なつた．

1) 日本人標準骨盤を有する，女性二屍体を凍結し，之を水平断，および矢状断に鋸断した．

2) 各切片を解剖学的に検討し，所属リンパ節，基靱帯を含む投影図を作製した．

3) 之等の図は放射線治療の解剖学的基礎を示している．

Introduction

The primary basis of medicine lies in the study of anatomy, so also the first step towards the study of the radiation therapy of malignant diseases begins with the knowledge of anatomy. Most text-books on anatomy are compiled as text-books on systematic anatomy for medical students or as guides to the surgery. There are many topographic atlas illustrating the local anatomical details necessary for diagnosis and surgery, but those showing the spatial relationships between the organs and the three-dimentional position of the organs towards the vessels and bones are

* Grateful acknowledgment to the Taito-Pfeizer Fundation for these anatomical series.

sadly lacking, so that it is difficult to undertsand such inter-relationships or projections to the surface. Recently, text-books such as "Surface & Radiological Anatomy[3]", "Atlas postmortaler Angiogramme[13]" etc[2,12] have been published for the purpose of roentgen diagnosis and therapy, but it is not sufficient for practical application in radiation therapy. At present, the two principal methods for the treatment of cervical cancer are surgery and radiation. When one compares these two methods, today, the specific locale designated for resection or radiation remain absolutely the same since the studies and reports by Wertheim's resection method, and Heyman's[1)10)] radiation method respectively. However, the methods differ completely. It therefore follows naturally that an anatomical atlas for surgery and an anatomical atlas for radiation therapy is required. This cross section atlas is that of the female pelvis for use in radiation therapy. This atlas shows chiefly the spatial relationships existing between the organs, bones and blood vessels, and thier projection pictures to the surface. However, some parts which are not importance for radiation therapy are excluded.

This report is of a fundamental nature, and does not indicated the practical treatment of radiation therapy. The method of radiation therapy should be determined by combining radiation biology and physics with the finding of this report and together with anatomical and pathological knowlege, clinical treatment may be begun. This atlas should be useful for the determination of position and area.

Method

The general principles followed in the drawing up of this atlas as follows[6],acorpse in the artery of which is injected some opaque medium is frozen and then sawn to 1.5 cm to 2.0 cm thickness. Each section is investigated macroscopically and x-rayed anatomically, and the atlas reconstructed from these findings. Corpses used directly for the making of this atlas are those of Japanese females the one aged 17 and the other nearly 30 without macro-pathological change in pelvic organs. Those obstetric measurements of two corpses show under table. and it may be considered within normal limits.

Table Obstetric measurement of two corpses.

	D. spinarum	D. cristarum	D. trochanterica	Conj. ext.
A aged 17	21.5cm	26.5cm	30.0cm	/
B aged nearly 30	22.0	25.5	30.0	18.0cm
Standard for Japanese	23.0	26.0	28.0	19.0

In order to indicate the connection between the size and position of each figure, a certain plane underlying the corpse has been assumed. Then, the section of this imaginary plane has been settled as a basic line. In the sagittal section figure, the line under the corpse is the basic line, and its length is 25cm. Vertical arrows to the basic line indicate the position of *Spina iliaca ant. sup.* and *Trochanter major*. In the horizontal section figure, its length is 10cm. In this report, figures, S-2, S-3, S-8 to S-12, H-11, H-12, back view of H-1, are excluded owing the fact that they are scarcely needed for therapy or thier being symmetric. About anatomical words, this report takes P.N.A. as a rule, though a few are in clinical usage.

Text Figure

Schematic figure that indicates the sawn position.

This figure illustrates the sawn position both sagittal and horizontal. The intervals are 1.5cm for the sagittal, 2.0cm for the horizontal. Numbers indicate each section. The following illustrated figures indicate the sagittal section viewed from the right, and the horizontal section viewed from the top.

Roentgen Picture Corpse B. right half. F.F.D. 160cm.

This is a right to left post-mortal angiography of corpse B used for the preparation of sagittal section. It is a photograph of the reconstructed right half side that has been already sawn to sections. This picture shows roughly the direction of external and internal iliac arteries and its branches. Cloudy shadows in the middle part are fine arteries in *Corpus uteri*. Close observation reveals that the loss by sawing are few.

Roentgen Picture Corpse. A. F.F.D. 160cm.

This post-mortal angiography is that of corpse A which is used for obtaining horizontal sections. The X-ray direction is anterior to posterior. The opaque medium is injected so well that the distribution of arteries in pelvis is observed to the fine parts, but the vessels in *Corpus uteri* cannot be injected for some unknown reason. Radial arteries at the upper half are the branch arteries of *A. mesenterica*.

Fig. S-4 Sagittal Section. 4.5cm to the right of the midline.

This figure indicates a position close to the right minor pelvic wall. The middle part surrounded by *M. levator ani*, *M. coccygeus*, *Plexus lumbosacralis*, and *A.uterina* consists mostly fatty and soft connective tissues, and includes the end of *Lig. cardinale* and many lymph nodes. A little more laterally to this section is situated the ureter, *A. uterina*, *A.V. et N. obturatoria*, and in further lateral position, there is *A. iliaca ext.* The inner side is limited by peritoneum where are included the intra-peritoneal organs, and so, radiation damage at the rectum and others must be considered. Point B. settled by the Manchester System[10] is closely lateral to this section, and there is located as mentioned above the end of *Lig. cardinale*, many vessels and lymph nodes.

Fig. S-5 Sagittal Section. 3.0cm to the right of the midline.

The middle trunk of *Lig. cardinale* is almost triangular in form with the *A. uterina* at the apex and its base gradually changes into the *Paracorpium*. In this triangular part, contains the ureter, *A. uterina*, many vein plexus and lymph vessels. It is also in this part that a cancer infiltration may be palpated as a induration by rectal examination sometimes.

Fig. S-6 Sagittal Section. 1.5cm to the right of the midline.

This figure indicates a position close to the exterior of uterus. *Lig. latum uteri* is seen and extends into the *Lig. cardinale* descending to the cervical part. Point A. settled by the Manchester System is located closely lateral to this section. Due to *Sinistra flextio uteri* in this corpse, *Corpse uteri* does not appear yet, but as the position of the cervical part is almost at the midline, it may be considered to be within the normal limits.

Fig. S-7 Sagittal Section. Midline.

As mentioned previously, the uterus body is moved a little to the left, but the cervical part is located almost in the midline. There is almost no intervals between the vagina and rectum or bladder, so care must be taken in therapeutical treatment by intra-vaginal Radium applicators.

Fig. H-10 Horizontal Section.

2cm below *Umbilicus*. In this figure is demonstrated *Corpus vertebrae lumbales-4*, *Aorta* and *Vena cava* which have just started to separate, and ureters along the side of these.

Fig. H-9 Horizontal Section.

In this figure is indicated *Disci intervertebrale lumbales-4*, and *A. et V. iliaca com.* separated from the abdominal vessels. These arteries, veins, and lymph nodes are of the same name. *Lnn. iliaca com.* are surrounded with fatty tissues.

Fig. H-8 Horizontal Section.

In this figure is indicated *Processus spinosus vertebrae lumbales-5*, *Sacrum*, *Promontrium* and *A. et V. iliaca ext. et int.* which are separated from common iliac vessels. Ureters are located in the middle of these vessels. *Lnn. iliaca ext. et int.* are closely fixed to these vessels. These are surrounded with fatty tissues like above figures. Metastases to these nodes are frequent, so at operation, these are removed with the fatty tissues.

Fig. H-7 Horizontal Section.

This corresponds exactly to the position of *Spina iliaca ant. sup.* External and internal iliac vessels and lymph nodes of the same name are surrounded with fatty tissues as in previous figures. At operation, these tissues are also removed.

Fig. H-6 Horizontal Section.

Pelvis narrows and becomes the minor pelvis.

Fig. H-5 Horizontal Section.

In this figure is shown the *Fundus uteri* and *Ovarium*. Pelvic bones mold into the minor pelvis. At the inner sides and posterior to the pelvic wall, there is fatty and soft connective tissue containing the end of *Lig. cardinale* attached to the pelvic wall. Also there are seveal lymph nodes.

Fig. H-4 Horizontal Section.

In this figure is shown *Lig. latum uteri* and upper part of *Lig. cardinale* at the both sides of uterus. In this part, there is found *A. uterina*, ureter, many vein plexus and lymph nodes. Point A. and Point B. are also on this section. As mentioned previously, any induration due to cancer infiltration and palpable rectally would be found in this part. (see Fig. S-4, S-5, S-6, sagittal section) *A. V. et N. oburatorius* run along the *M. obturatorius int.*. Anterior to the midline, appears the upper wall of the bladder.

Fig. H-3 Horizontal Section.

In this figure is shown the end of *Cervix uteri* surrounded by *Portio vaginalis*.

At both sides of the vagina, is the *Paracorpium*. *A.V. et N. obturatorius* are passing through the *Canalis obturatoria* between the *M. obturatorius int.* and pelvic bone. Here is also demonstrated *Fascia diaphragmatis pelvis*.

Fig. H-2 Horizontal Section.

In this figure is shown the narrow end of *Fascia diaphragmatis pelvis*, which is the base of pelvis. Surrounding the vagina are many vein plexus. Bladder becomes *Urethra* which is expanded as *M. sphinctor urethrae*.

Fig. H-1 Horizontal Section.

This is the end of vagina, and here is indicated glands of external genitalia.

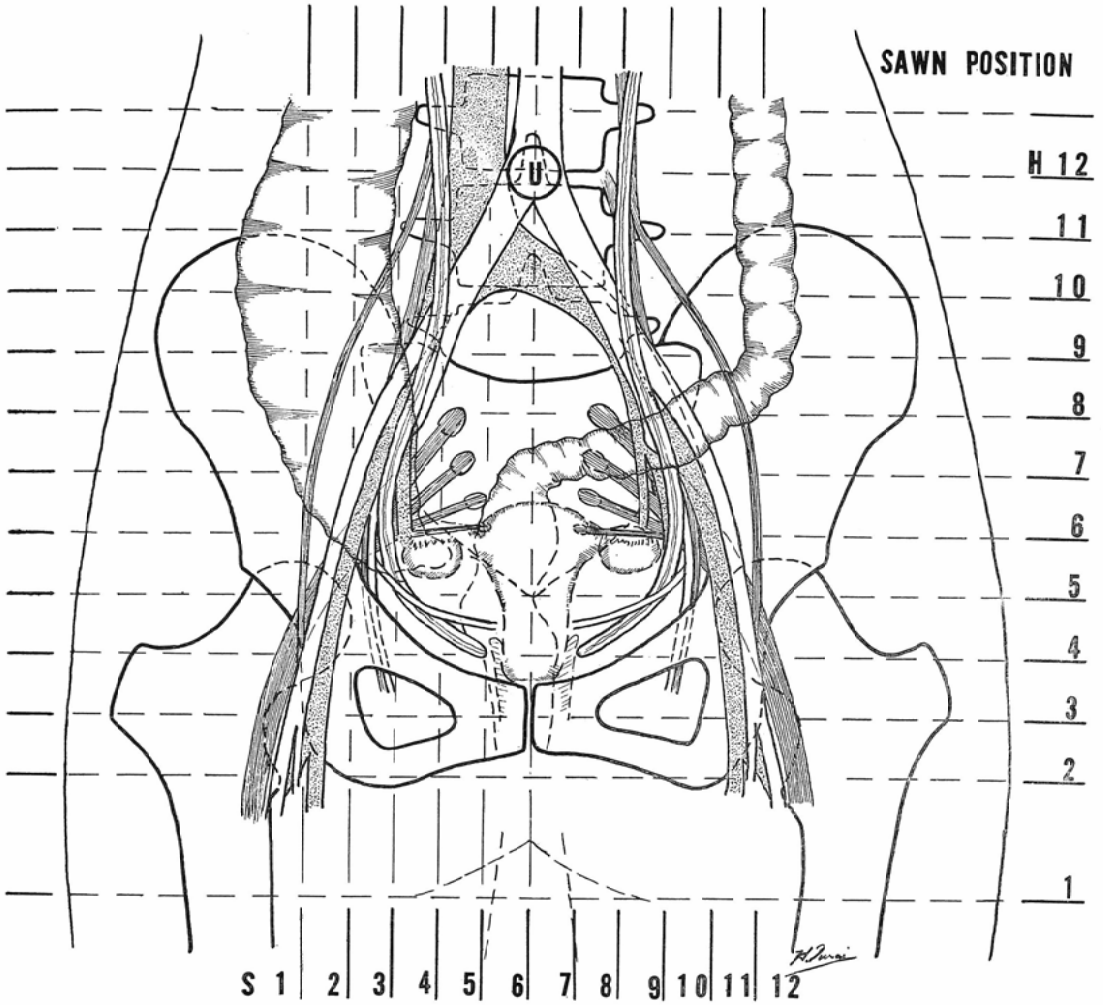
Fig. P-1 Projection figures.

The side view is constructed mainly from sagittal sections, and some parts from horizontal sections. These indicate projective relationships of vessels, nerves, lymph nodes, *Lig. cardinale* and pelvic bones. Schematic lymph nodes groups show the related lymph nodes position, and fine lines from the outside of *Cervix uteri* to the lateral wall of pelvis show the position of *Lig. cardinale*. The area along the vesseles shown by dotted lines in the left half of frontal view indicates the projective position that the cancer infiltration and metastases to the lymph nodes may be suggested, should radiation therapy be necessary.

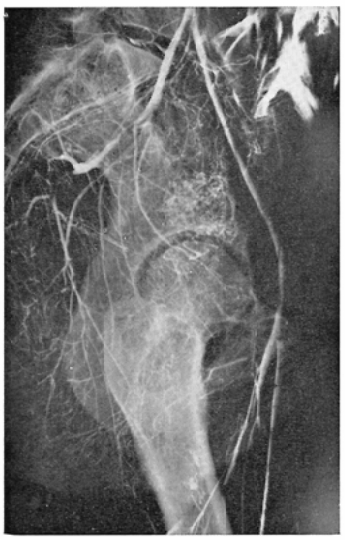
Position of *Lig. cardinale*, lymph nodes[11)4)], Point A and Point B.

Putting together the findings from these figures, *Lig. cardinale* is shown to be a fan-like form arising from the outer wall of *Cervix uteri*, spreading laterally, and adhering to the lateral and posterior wall of the pelvis. At its commencement, its upper part is connected to the *Lig. latum uteri* and basal part shades into the *Paracorpium*. In its middle part, it is nearly triangular in cross secction with the *A. uterina* at the apex and the base shading into the *Paracorpium* and limited by *M. levator ani*. Its end or adherent part is located at the lateral and posterior wall of pelvis, which is surrounded by *M. levator ani*, *M. coccygeus*, *Plexus lumbosacralis*, and *A. uterina*. With regard to lymph node groups, except for the *Lnn. sacralis*, they are closely fixed to the vessels of the same name, and thus, the names and positions may be easily understood.

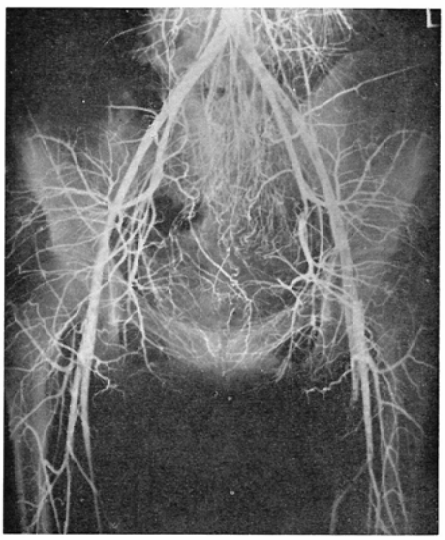
The above mentioned Point A. is located at the commencement of *Lig. cardinale* or a little lateral to the *Cervix uteri*. Point B. is located at the outer end of *Lig. cardinale* where it is the attached to the minor pelvis, where is also *A.V. et N. obuturatorius*, *A. uterina*, ureter and many lymph nodes with fatty and soft connective tissues.



Schematic figure that indicates the sawn position



Corsse B



Corpse A

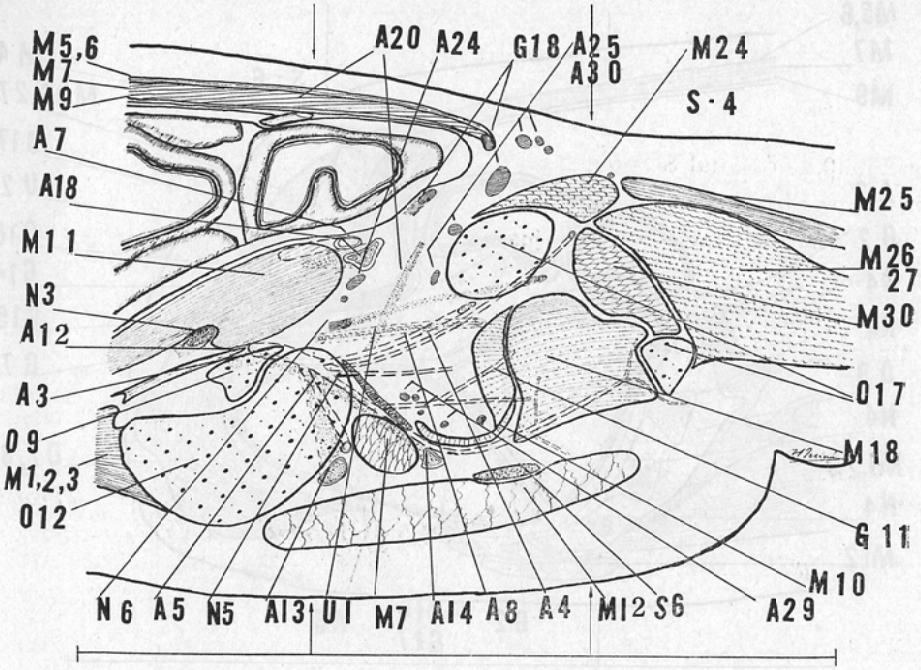

M5,6
M7
M9
A7
A18
M11
N3
A12
A3
09
M1,2,3
012
A20
A24
G18
A25
A30
M24
S-4
M25
M26
27
M30
017
M18
G11
M10
A29
N6
A5
N5
A13
U1
M7
A14
A8
A4
M12
S6

Fig. S-4

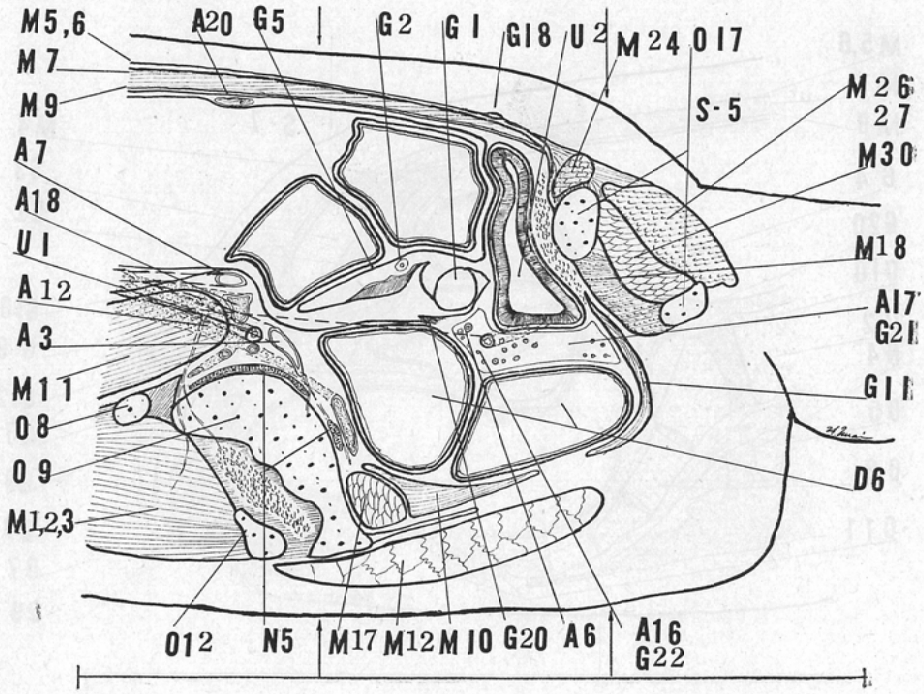

M5,6
M7
M9
A7
A18
U1
A12
A3
M11
08
09
M1,2,3
A20
G5
G2
G1
G18
U2
M24
017
S-5
M26
27
M30
M18
A17
G21
G11
D6
012
N5
M17
M12
M10
G20
A6
A16
G22

Fig. S-5

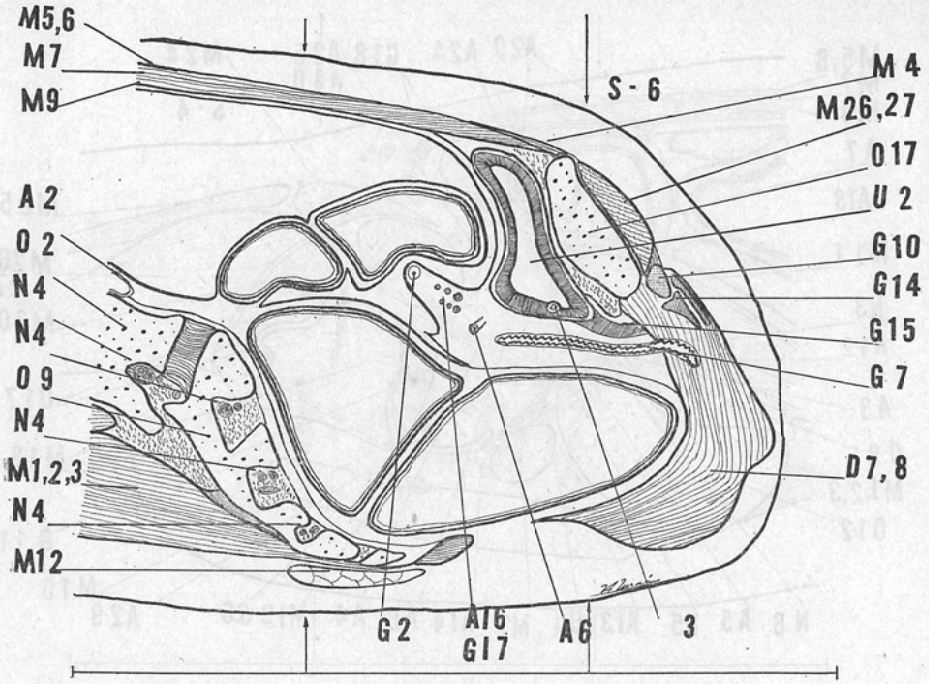

M5,6
M7
M9
S-6
M4
M26,27
O17
U2
G10
G14
G15
G7
D7,8
A2
O2
N4
N4
O9
N4
M1,2,3
N4
M12
G2
A16
G17
A6
3

Fig. S-6

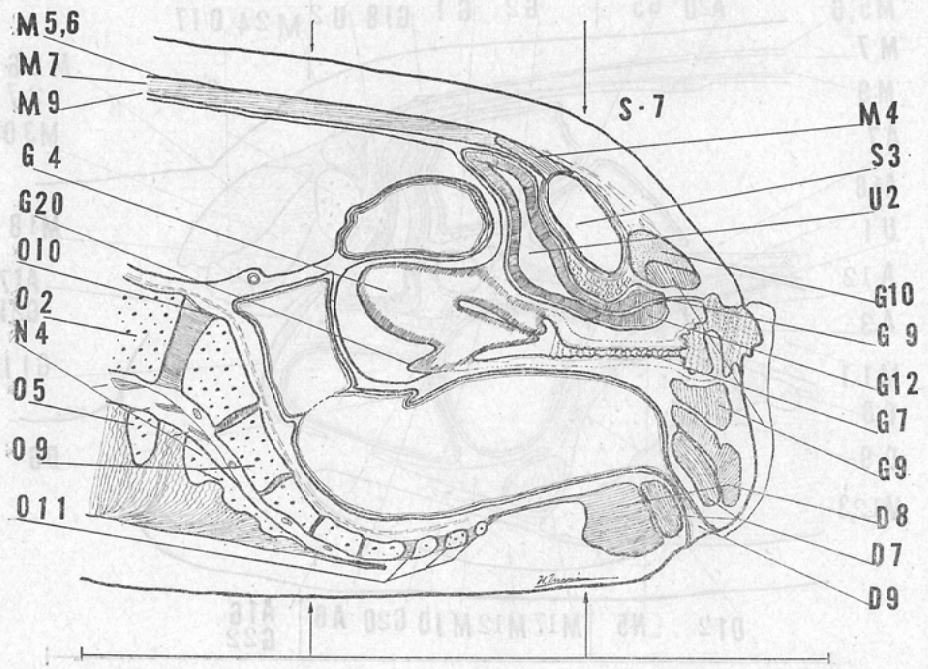

M5,6
M7
M9
S-7
M4
S3
U2
G10
G9
G12
G7
G9
D8
D7
D9
G4
G20
O10
O2
N4
O5
O9
O11

Fig. S-7

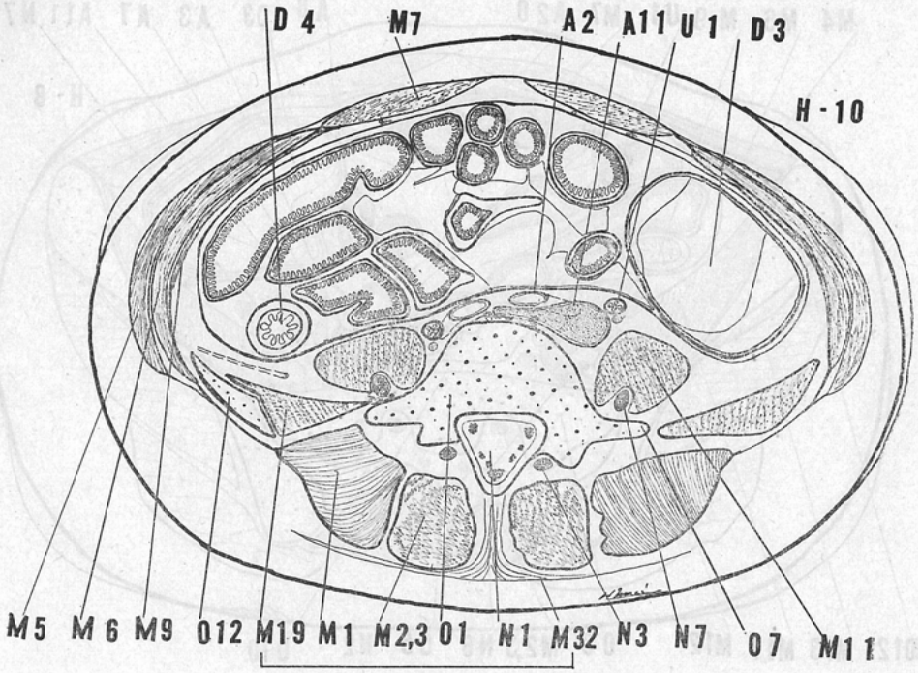


Fig. H-10

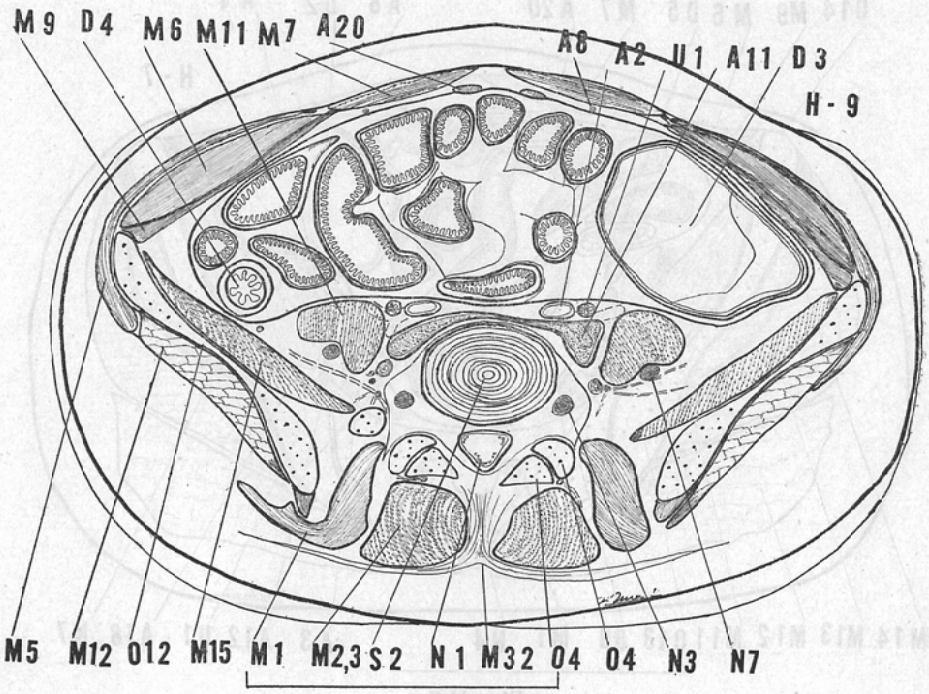


Fig. H-9

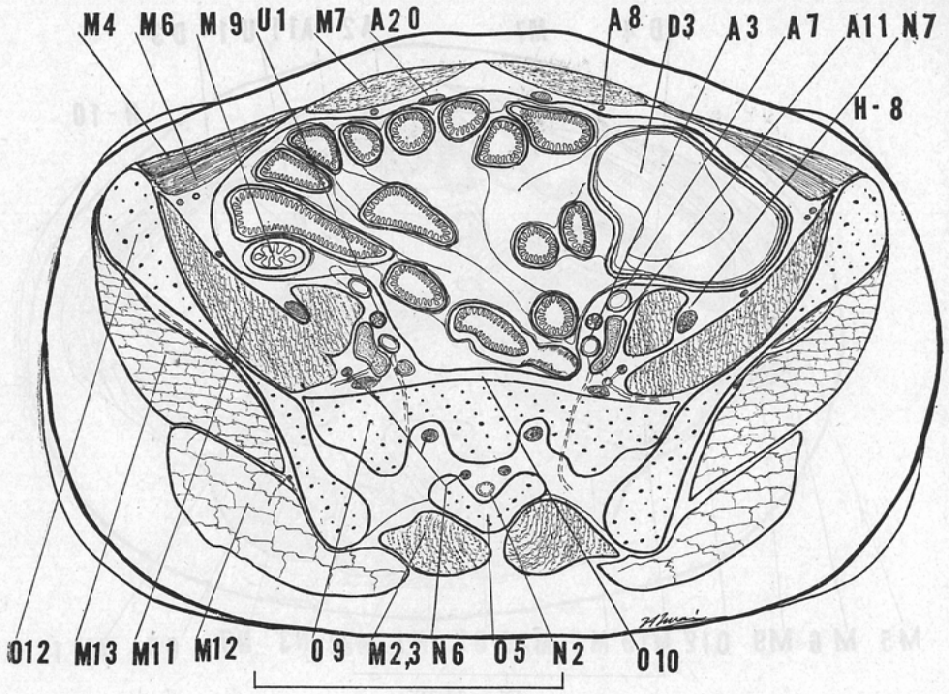

M4 M6 M9 U1 M7 A20 A8 D3 A3 A7 A11 N7
H-8
O12 M13 M11 M12 O9 M2,3 N6 O5 N2 O10

Fig. H-8

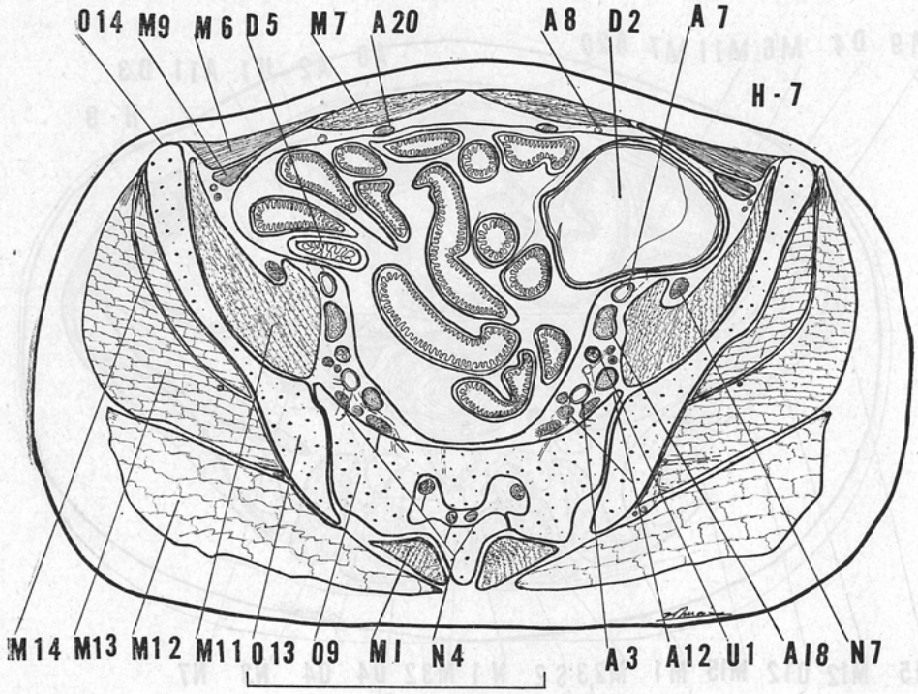

O14 M9 M6 D5 M7 A20 A8 D2 A7
H-7
M14 M13 M12 M11 O13 O9 MI N4 A3 A12 U1 A18 N7

Fig. H-7

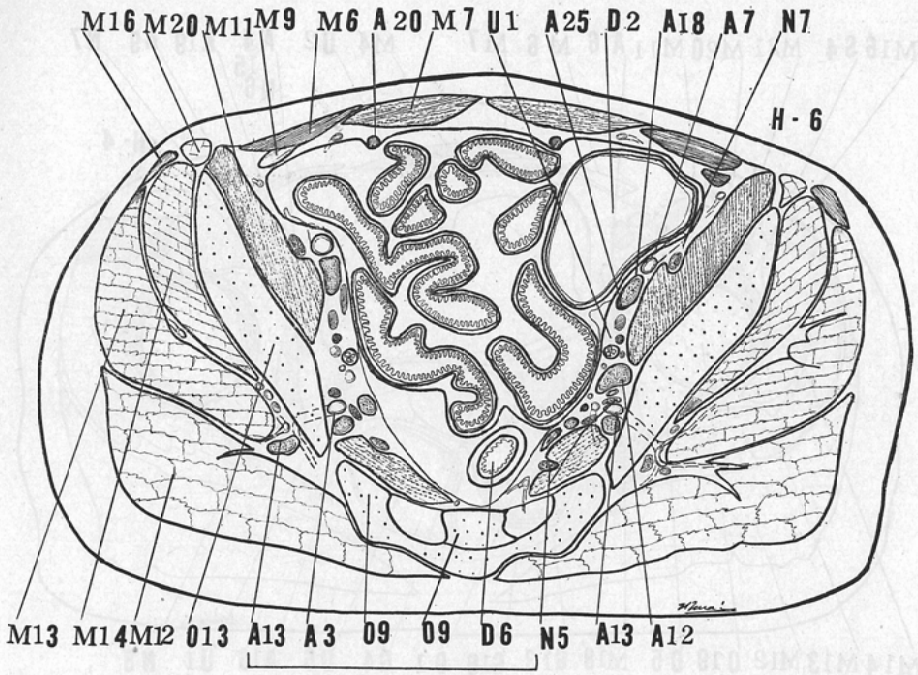

M16 M20 M11 M9 M6 A20 M7 U1 A25 D2 A18 A7 N7
H-6
M13 M14 M12 O13 A13 A3 O9 O9 D6 N5 A13 A12

Fig. H-6

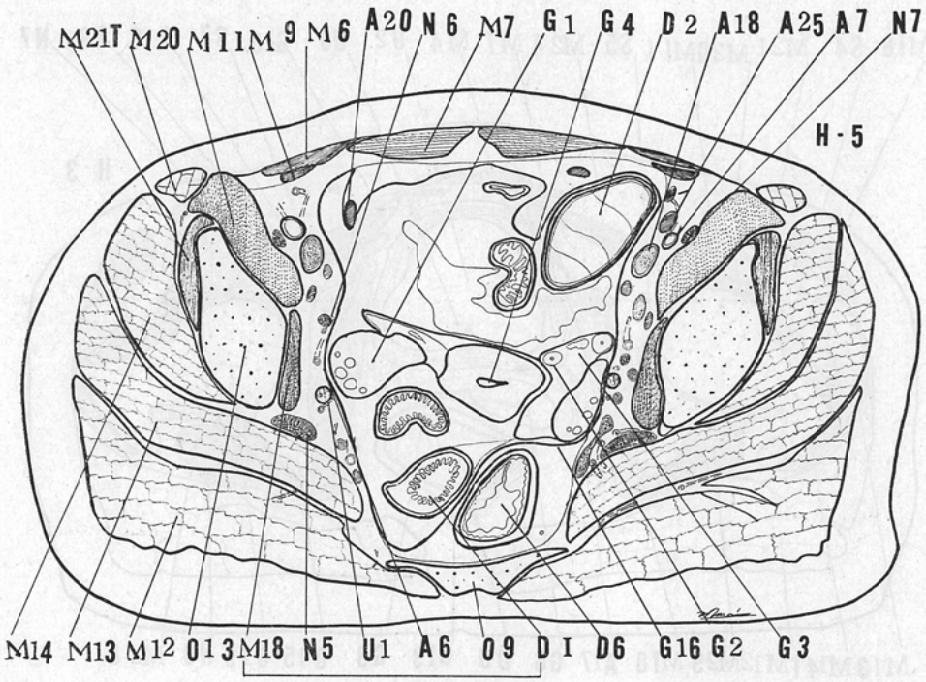

M21 M20 M11 M9 M6 A20 N6 M7 G1 G4 D2 A18 A25 A7 N7
H-5
M14 M13 M12 O13 M18 N5 U1 A6 O9 DI D6 G16 G2 G3

Fig. H-5

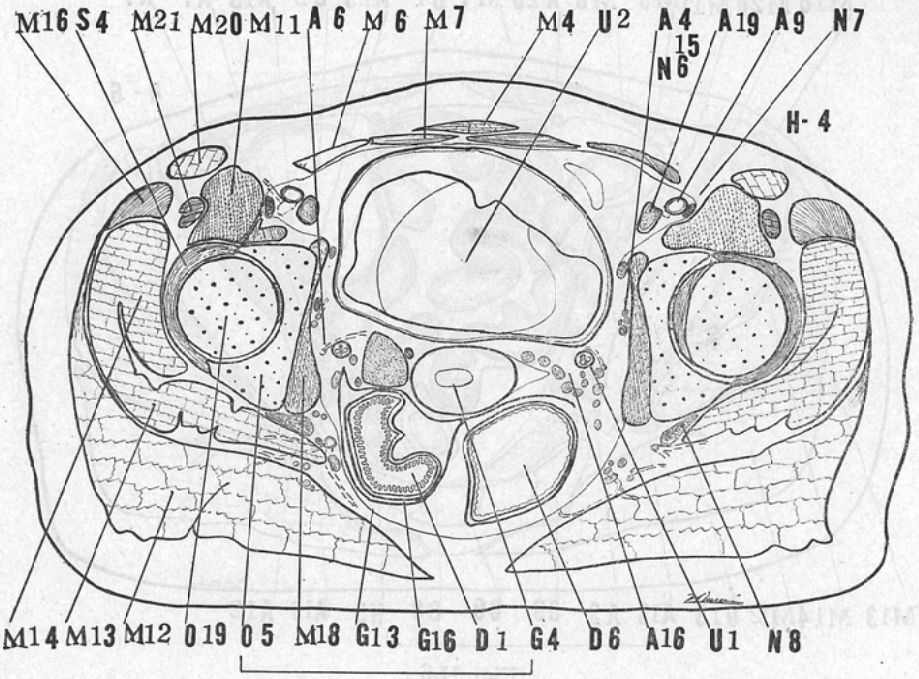

M16 S4 M21 M20 M11 A6 M6 M7 M4 U2 A4 A19 A9 N7
N6 15
H-4
M14 M13 M12 O19 O5 M18 G13 G16 D1 G4 D6 A16 U1 N8

Fig. H-4

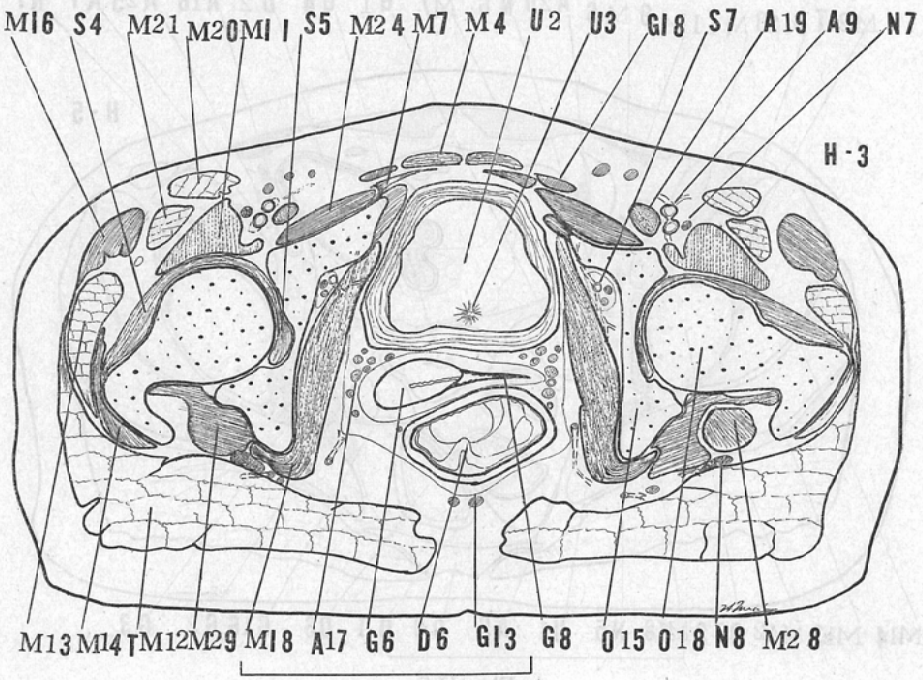

M16 S4 M21 M20 M11 S5 M24 M7 M4 U2 U3 G18 S7 A19 A9 N7
H-3
M13 M14 M12 M29 M18 A17 G6 D6 G13 G8 O15 O18 N8 M28

Fig. H-3

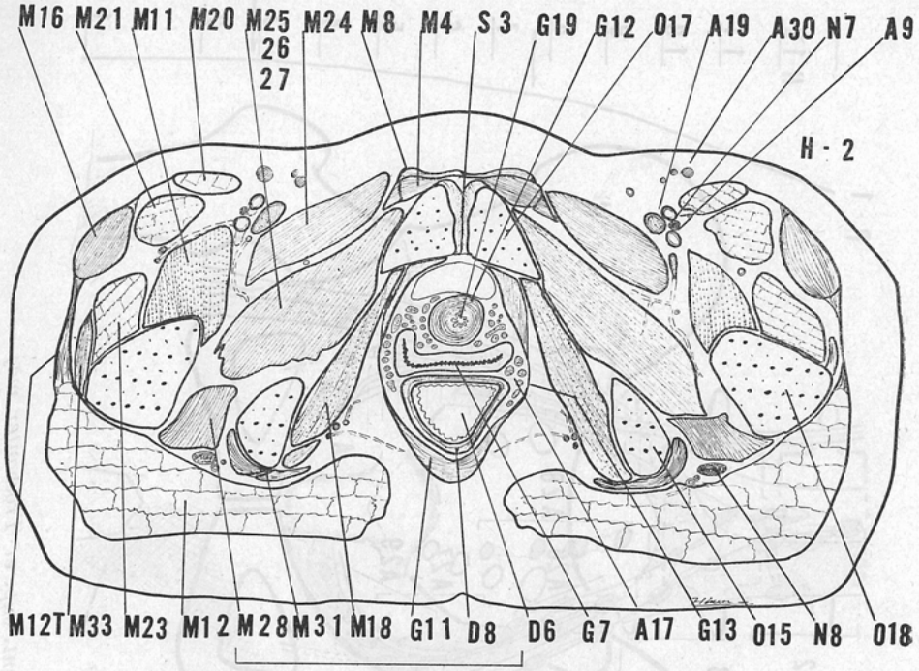
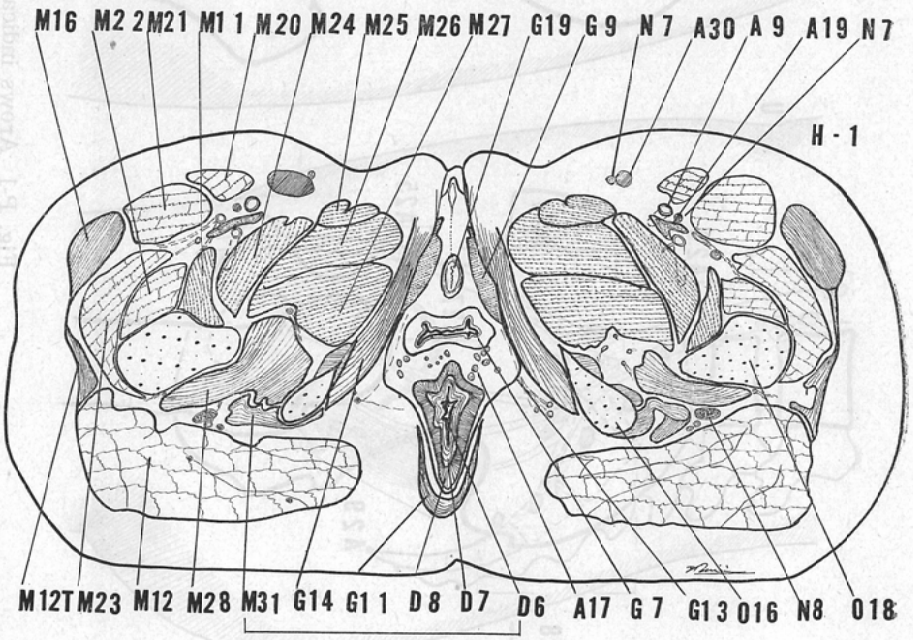

M16 M21 M11 M20 M25 26 27 M24 M8 M4 S3 G19 G12 O17 A19 A30 N7 A9
H-2
M12T M33 M23 M12 M28 M31 M18 G11 D8 D6 G7 A17 G13 O15 N8 O18

Fig. H-2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H-1
M12T M23 M12 M28 M31 G14 G11 D8 D7 D6 A17 G7 G13 O16 N8 O18

Fig. H-1

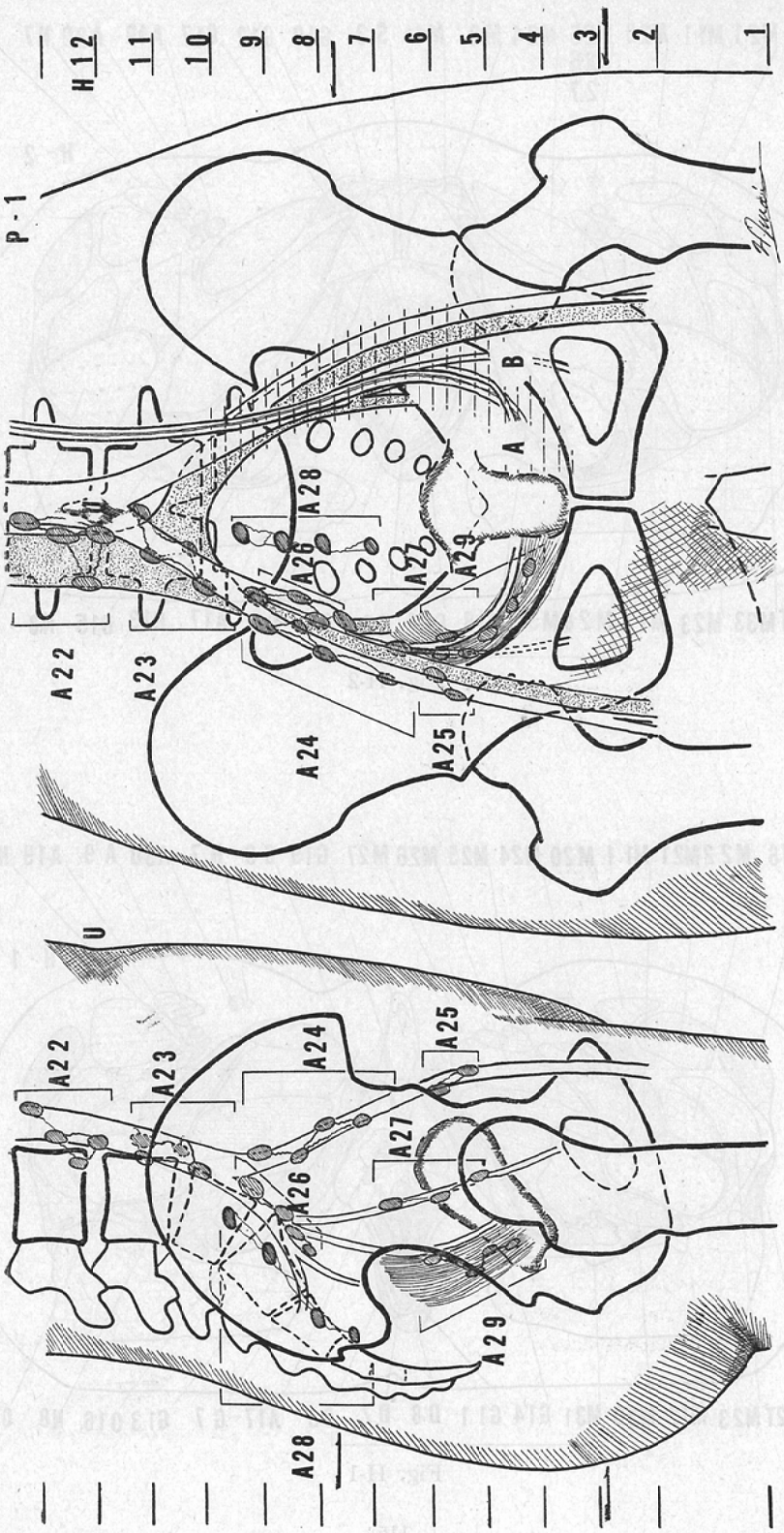

Fig. P-1 Arows indicate, *Sp. iliaca ant. sup. et Trochanter maj.*

APPENDIX

O— 1 *Corpus vertebrae lumbales 4*
O— 2 *Corpus vertebrae lumbales 5*
O— 3 *Processus spinosus vertebrae lumbales 3*
O— 4 *Processus spinosus vertebrae lumbales 4*
O— 5 *Processus spinosus vertebrae lumbales 5*
O— 6 *Processus transversus vertebrae lumbales 3*
O— 7 *Processus transversus vertebrae lumbales 4*
O— 8 *Processus transversus vertebrae lumbales 5*
O— 9 *Os sacrum*
O—10 *Promontorium*
O—11 *Os coccygis*
O—12 *Os ilium*
O—13 *Corpus ossis ilium*
O—14 *Spina iliaca anterior superior*
O—15 *Corpus ossis ishii*
O—16 *Tuber ishiadicum*
O—17 *Os pubis*
O—18 *Femur*
O—19 *Caput femoris*
O—20 *Trochanter major*

S—1 *Disci intervertebrale lumbales 3*
S—2 *Disci intervertebrale lumbales 4*
S—3 *Symphsis pubica*
S—4 *Lig. iliofemorale*
S—5 *Lig. capitis femoris*
S—6 *Lig. sacrotuberale*
S—7 *Canalis obturatorius*

M— 1 *M.iliocostalis lumborum*
M— 2 *M. longissimus*
M— 3 *M. multifidus*
M— 4 *M. pyramidalis*
M— 5 *M. obliquus externus abdominis*
M— 6 *M. obliquus internus abdominis*
M— 7 *M. rectus abdominis*
M— 8 *Lig. pectineale*
M— 9 *M. transversus abdominis*
M—10 *M. coccygeus*
M—11 *M. iliopsoas*
M—12 *M. gluteus maximus*
M—12T *Tendo m. glutei maximus*
M—13 *M. gluteus medius*
M—14 *M. gluteus minimus*
M—15 *M. iliacus*
M—16 *M. tensor fasciae latae*
M—17 *M. piriformis*
M—18 *M. obturatorius internus*
M—19 *M. quadratus lumborum*
M—20 *M. sartorius*
M—21 *M. rectus femoris*
M—21T *Tendo m. recti femoris*
M—22 *M. vastus medialis*
M—23 *M. vastus lateralis*
M—24 *M. pectineus*
M—25 *M. adductor longus*
M—26 *M. adductor brevis*
M—27 *M. adductor magnus*
M—28 *M. quadratus femoris*
M—29 *M. gemellus superior et inferior*
M—30 *M. obturatorius externus*
M—31 *M. semitendinosus*
M—32 *Fascia lumbodorsale*
M—33 *B. trochanterica m. glutei maximi*

A— 1 *Aorta abdominalis*
A— 2 *A. iliaca communis*
A— 3 *A. obturatoria*
A— 4 *A. glutea superior*
A— 5 *A. uterina*
A— 6 *A. iliaca externa*
A— 7 *A. epigastirca inferior*
A— 8 *A. femoralis*
A—10 *Vena cava inferior*
A—11 *V. iliaca communis*
A—12 *V. iliaca interna*
A—13 *V. glutea superior*
A—14 *V. glutea inferior*
A—15 *Vv. obturatoriae*
A—16 *Plexus venosus uterinus*
A—17 *Plexus venosus vaginalis*
A—18 *V. iliaca externa*
A—19 *V. femoralis*
A—20 *Lig. umbilicale laterale*
A—21 *Umbilicus*
A—22 *Lnn. aortae abdominales*
A—23 *Lnn. iliaci communes*
A—24 *Lnn. iliaci externi*
A—25 *Lnn. suprainguinales*
A—26 *Lnn. iliaci interni*

A−27 *Lnn. obturatorii*
A−28 *Lnn. sacrales*
A−29 *Lnn. ligamenti cardinales*
A−30 *Lnn. Femoralis*

D− 1 *Intestinum tenue*
D− 2 *Caecum*
D− 3 *Colon ascendens*
D− 4 *Colon descendens*
D− 5 *Colon sigmoideum*
D− 6 *Rectum*
D− 7 *M. sphincter ani internus*
D− 8 *M. sphincter ani externus*
D− 9 *Anus*

U− 1 *Ureter*
U− 2 *Vesica urinaria*
U− 3 *Ostium urethrae internum*
U− 4 *Ostium ureteris*

G− 1 *Ovarium*
G− 2 *Tuba uterina*
G− 3 *Mesosalpinx*
G− 4 *Uterus*
G− 5 *Infundibulum tubae uterinae*
G− 6 *Cervix uteri*
G− 7 *Vagina*
G− 8 *Fornix vaginae*
G− 9 *Bulbus vestibuli*
G−10 *Corpus cavernosum clitoridis*
G−11 *M. levator ani*
G−12 *M. sphincter urethrae*
G−13 *Fascia diaphragmatis pelvis*
G−14 *M. ischiocavernosus*
G−15 *Tunica muscularis*
G−16 *Peritoneum*
G−17 *Lig. latum uteri*
G−18 *Lig. teres uteri*
G−19 *Uretehra feminina*
G−20 *Lig. sacro uterina*
G−21 *Paracorpium*
G−22 *Lig. cardinale*
N− 1 *Cauda equina*
N− 2 *Filum terminale*
N− 3 *Nn. lumbales*
N− 4 *Nn. sacrales*
N− 5 *N. obturatorius*
N− 6 *N. femoralis*
N− 7 *N. ischiadicus*

Discusion

Results of radiation therapy for cervical cancer reported by Heyman and et al have led even Wertheim, the originator of expansive total abdominal hysterectomy, to criticise surgical treatment of cervical cancer but this has come to no purpose. But, later, around 1920, a new method of expansive radical hysterectomy had reported by Latzko and Okabayashi respectively[7]. At present, with the progress of general surgical technique, it is plain enough that the result of operation method for cervical cancer Stage 1,2, is better than radiation. The improvement of operation results is chiefly due to expansive resection by systematic separation of *Lig. cardinale*, and complete removal of related lymph nodes. Information about the frequency of metastases in lymph nodes at each stage is contained in Henriksen's detailed reports[5] of pathological autopsy, and several reports by Japanese gynecologist[8] on operation findings. Upon examination of these reports, frequency of metastases Stage 1 is rear. Also the results of both operation and radiation therapy are so good that the 5 years survival rate is over 80%. However, the frequency of metastases in Stage 2 increases considerably, and here the results obtained by the operation method are better than those by radiation. From this fact, it is presumed that the old radiation therapy is ineffectual for cancer infiltration which has reached the pelvic wall. Ogino's detailed reports[9] have confirmed the above mentioned presumption. The reason for the ineffectiveness of the old radiation therapy for cancer infiltration which has reached the

pelvic wall, may be either that the radiation doses do not reach the tumour in lethal doses, or the radiation ray does not radiate the metastic parts. Today, by Henriksen's reports etc., the frequency and localisation of metastases in each stage are well known.

Understanding the above mentioned facts, the radiotherapist must decide the radiation area corresponding to each Stage. Thus, without damaging the digesting organs etc., the radiotherapist must reconsider his method of radiating lethal doses to the presumed metastic parts based on anatomical and pathological knowledge.

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Zusammenfassung

Eine anatomische Begründung zum Uteruskarzinoma ist hier folgenden versucht worden.

1) Die Lendenteilen der feminen Leichen mit massgebenden Becken waren gefroren und sagittal und horizontal gesägt worden.

2) Die einzelnen Schnittflächen wurden untersucht und wieder zusammengesetzt. Eine Reihe von Projektionbildern auf den Körperoberflächen der eine Behandlung fordernde Felder der *Lig. cardinale* und Lymphdrüsen sind gemacht worden.

3) Hiermit könnte man einen Grund der zukünftigen Röntgen Therapie für Uteruskarzinoma feststellen.

RFFERENCE

1) Eto. H et al.: Radiation medicine. (in japanese) Igakushoin. Tokyo. 1959. —2) Eycleshymer. & B.M. Schoemaker. A cross section anatomy. D. Appleton. Century. Co. New York 1938. — 3) Hamilton. W.J & G. Simon. Surface & Radiological anatomy. W. Heffer & Sons Ltd. Combridge. 1958. — 4) Hashimoto. K. et al.: A Nomenclature of the pelvic lymph nodes in treatment of the cervix. 1962 Jap. j. cancer clinic. Vol. 8. No. 1. p. 3—6. (In Japanese) — 5) Henriksen. E.: The lymphatic spread of carcinoma of the cervix and body of the uterus. 1949 Am. J. Obst. & Gynec. Vol. 58 No. 5 p. 924—942. Distribution of metastases in stage 1 carcinoma of the cervix. 1960 ibid. Vol. 80 No. 5 p. 919—932. — 6) Iwai. H. et al.: Anatomical Analisis of Skiagram of the Cadaver (in japanese) 1959 Nipp. Act. Radiol. Vol. 19 No. 8 p. 127—135. — 7) Kobayashi. T.: Textbook of operation of carcinoma of the cervix uteri. (in japanese) 1960 Igakushoin. Tokyo. —8) Mitami. Y. Pathology and clinic of carcinoma of the uterire cervix (in japanese) 1957 Igakushoin. Tokyo. —9) Ogino. K.: Analsis of the results of cancer of cervix operated at Takeyama Hospital from 1940—1954. (in japanese) The world of Obst. & Gynec. Vol. 12No. 11p. 3—16. 1960 — 10) Paterson. R.: The treatment of malignant disease by radium and X-ray. Edward Arnold. London. 1960. — 11) Reifenstuhl. G.: Das Lymphsystem des weiblichen Genitaile. Urban & Schwarzenberg. München. 1957. — 12) de Ribet. R.M.: Travaux du laboratoire d'anatomie. Faculte de medicine D'alger. 1953. — 13) Schoemaker. J. & H. Vieten: Atlas postmortaler Angiogramme. Georg Thieme. Stuttgart. 1954.