資料　3

Making and Evaluation of a Simulator for the Teaching or Learning of Abdominal Pattern in the Japanese Kampo Style by Clinical Doctors and Educational Faculty

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INTORODUCTION

Abdominal palpation is a system of diagnosis used in Kampo medicine, unique to Japan, designed to discern the patient's "abdominal pattern" of systemic physical disorder.

Efforts in developing a simulator for abdominal palpation have hitherto been inadequate, and indeed there has been no such simulator developed in Japan.

For the present study, we developed a simulator for teaching abdominal palpation (Fukushin Simulator).

We conducted evaluations with clinicians who had attended our lectures on Kampo medicine, at which they had tried out the simulator for themselves ("learners"); and teaching faculty who lecture on Kampo medicine, after they had had a chance to attempt abdominal diagnosis using the simulator ("educators").

MATERIAL AND METHODS

A recent lecture on Kampo medicine, taught by the authors, was attended by 149 clinicians, who were asked at the end of proceedings to answer an anonymous questionnaire survey.

We polled 14 educators on their reactions to the simulator. Their clinical experience with Kampo medicine ranged from 6–25 years, and 11 of them were board certified members of the Japan Society for Oriental Medicine.

We asked for their opinions, on a 6-point scale, regarding the usefulness of and their interest towards the simulator. A final question asked them to write their impressions and opinions freely.

RESULTS

The Fukushin Simulator consists of 6 abdominal models, designed to recreate 6 significant abdominal patterns. The structure and feature of the models are displayed in Figure. 1 : Fukuchokukinkincho, Shinkahiko, Kyokyokuman, Shofukukoman, Shofukufujin, and Shinsuion (Table 1).

After attending a lecture featuring the simulator, 77.2% of learners judged the simulator to be "very useful" or "useful", and 76.5% said they were "very interested" or "interested" in the simulator(Figure2, 3).

Educators reported their reactions after a hands-on session with the simulator. Those finding the simulator "very useful" or "useful" accounted for 78.6%, and 85.7% were "very interested" or "interested" in the simulator.

We compared the responses of educators and learners regarding usefulness or interest, using the Mann-Whitney's u test.

The difference between the evaluations was not significant ($p=0.182$ or $p=0.126$): both groups appeared to consider the Fukushin simulator to be useful or to be interested in the simulator.

We also received useful criticisms and suggestions from learners and educators, such as:1)The "skin" on the models is insufficiently like human skin to be realistic and this aspect should be improved; 2) The model gives no feedback on pressure pain and it would be better if pain could be somehow incorporated into the model; 3) It would be preferable to mark the position of the groin; 4) It would be preferable if the simulator, in addition to representing isolated disease patterns, could show disease states where multiple patterns are simultaneously present.

DISCUSSION

One opinion voiced of learners was that the simulator was useful for diagnosis, or for the first stage of understanding abdominal palpation, because actually touching the sites allowed doctors to "get a feel" for the actual practice of palpation.

One opinion voiced of educators was that abdominal palpation would be easy to understand for students using the simulator.

In the future we are hoping to incorporate movement such as palpitations into the models. In addition, we hope to develop a variable model, incorporating materials that can be manipulated to alter hardnesses at key sites and include a remote control device that would allow us to change settings.

Other planned improvements include a system to evaluate the pressure applied by a physician attempting abdominal diagnosis by means of pressure sensors.

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ORIENTAL MEDICINE

Towards the Standardization of Abdominal Strength in the Abdominal Palpation Diagnostic System of Kampo Medicine: Development of an Abdominal Strength Model in the Fukushin Simulator

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ABSTRACT

Introduction: **In the Kampo medical system, there is an abdominal palpation system of diagnosis indigenous to Japan called Fukushin. In this system, the physician palpates the patient's abdomen and interprets the physiological signs to obtain an "abdominal pattern", which is of paramount importance in the diagnosis of the patient's condition. One part of abdominal diagnosis is a determination of abdominal strength, important in determining excess and deficiency patterns, a key part of Kampo diagnosis. To aid in the determination of abdominal strength, we modified an existing Fukushin simulator used in abdominal palpation training to incorporate an abdominal strength model.**

Material and method: **We built costal and sternal bones using synthetic plastics and formed a thorax and pelvis. For the insides, we used urethane foam and other materials such as polyester and cotton to enable five gradations of abdominal resistance from weak to strong.**

Result: **We have developed 5 models reproducing different abdominal strengths, ranging from weak resistance to palpation to a strong resistance.**

Conclusion: **It is to be hoped that the abdominal strength model will aid in training physicians in Kampo abdominal palpation and in standardizing Kampo diagnosis.**

KEY WORDS

abdominal palpation, abdominal patterns, Kampo Medicine, abdominal strength, simulator

INTRODUCTION

Kampo medical theory holds that physiological changes are manifested in the abdomen. Accordingly, physicians use abdominal palpation called Fukushin, a diagnostic method developed in Japan, to interpret a patient's physiological state. In this method, used in all kinds of complaints, the physician palpates the patient's abdomen to determine the degree of resistance to the touch (overall and according to the area of the abdomen), the reaction of the patient to pressure, and other signs[1-5].

There have been attempts to interpret the abdominal patterns

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identified through abdominal palpation into western medical terms, but it has proven difficult to correlate the patterns with the data obtained from modern medical imagery or clinical tests[6-11]. There have been attempts to investigate abdominal patterns with a specially developed instrument, but results have been inconclusive[12].

One aspect of abdominal diagnosis is determination of abdominal strength. Weak abdominal strength means simply that resistance to palpation is weak, and this indicates a deficiency pattern. Strong abdominal strength -strong resistance to palpation- indicates by contrast an excess pattern. Moderate abdominal strength indicates a medium pattern between excess and deficiency pattern. In Kampo medicine, it is believed that a deficiency pattern indicates a small reaction symptom against pathogens, whereas an excess pattern indicates a large reaction against pathogens.

In the present study, as part of an attempt to improve training in abdominal palpation and to aim for greater standardization in diagnosis, we developed a new abdominal strength model added to an existing Fukushin simulator that we hope will become a standard.

SUBJECTS AND METHODS

Our abdominal model represents the abdomen of an adult male from 10 mm above the nipples to 135 mm below the umbilicus. The total length is 410 mm, width is 310 mm, and depth is 138 mm. To construct it, we made a base of a hard synthetic resin, and placed other synthetic parts thereon to form costal and sternal bones and a pelvis. To simulate the internal organs we used urethane foam with polyester and cotton. The skin was formed by shaping a flexible silicon resin in a mold taken from an actual male human abdomen and coating the model in it (Fig. 1).

We built 5 levels of resistance, in other words abdominal strength, into the model (Table 1). For deficiency patterns, we built one model with moderate deficiency (Model 2), and another where abdominal resistance is markedly weaker than in the chest and the abdomen is recessed, representing severe deficiency (Model 1).

For excess patterns, we built one model with moderate excess (Model 4) and another where the abdomen appears to be swollen compared to the chest and abdominal resistance is strong, representing a pattern of marked excess (Model 5).

Table 1. The Fukushin simulator featuring 5 models of abdominal strength

Model 1: Marked deficiency pattern: abdomen is recessed and abdominal strength is weak
Model 2: Moderate deficiency pattern: abdominal strength is somewhat weak
Model 3: Medium pattern: abdominal strength is moderate
Model 4: Moderate excess pattern: Abdominal strength is rather strong
Model 5: Marked excess pattern: Abdomen is prominent and abdominal strength is strong

RESULTS

We encountered a problem with the gas inside the abdominal model. When physicians pressed down on the model, they encountered a strange sensation caused by the gas, which threw off their perceptions of abdominal strength.

To solve this problem, we made several small air holes in the base and added four short legs to the model to make some space under it for air to escape. Physicians trying abdominal palpation with the improved model reported that the strange sensation had disappeared.

We placed polyester and cotton in the interior of the model, and coated it in urethane foam. We added several holes to adjust the resistance. This enabled a medium pattern between deficiency and excess (Model 3) (Fig. 2).

In this way, we created a model with low resistance to palpation representing a deficiency pattern and a model with high resistance to palpation representing an excess pattern.

For the deficiency patterns, we created Model 2 in a similar way to Model 3, using urethane foam (Fig. 3), but only in certain parts to make a slightly weaker resistance to palpation than in Model 3.

For Model 1, we layered polyester and cotton over the whole model, enabling us to realize a weaker resistance to pressure than

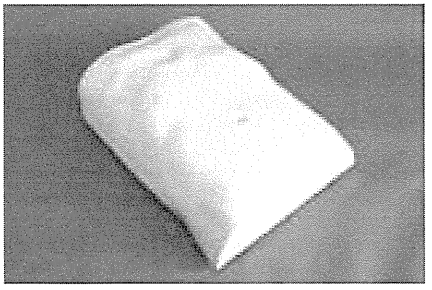

Figure 1. Overall view of the abdominal model featuring an adult male's torso from chest to lower umbilical region, coated in silicon

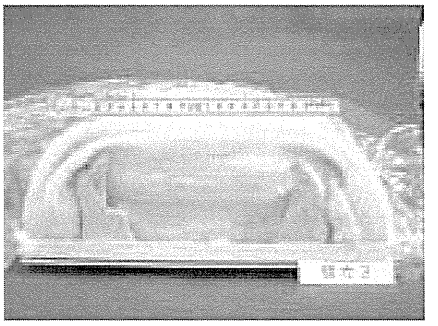

Figure 2. Interior structure of Model 3

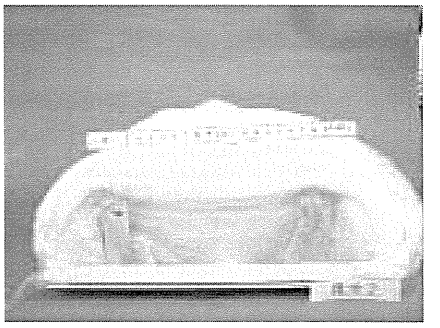

Figure 3. Interior structure of Model 2

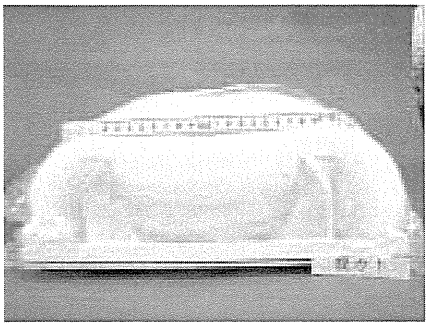

Figure 4. Interior structure of Model 1

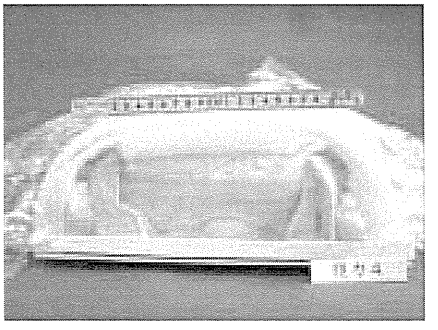

Figure 5. Interior structure of Model 4

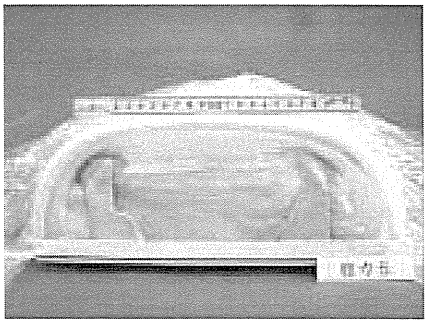

Figure 6. Interior structure of Model 5

Model 2 (Fig. 4). In addition, this model was built so that the abdominal area was recessed compared to the chest.

For excess patterns, we built Model 4, featuring a somewhat enhanced resistance to pressure, and Model 5, featuring strong resistance and a somewhat swollen appearance.

Model 4 was constructed in a similar way to model 3 (Fig. 5). We coated the model in urethane foam but did not add any holes, thus realizing a stronger resistance to pressure than Model 3.

For Model 5, we coated the entire model with a different kind of urethane foam from that used in Model 4 (Fig. 6), enabling a stronger resistance when compared to Model 4. We also ensured that in this model the abdomen was visibly swollen compared to the chest.

DISCUSSION

In today's Japan, the modern western system of medicine is at the forefront. However, many physicians are conscious of certain limits to western medicine's applicability and have high hopes for Kampo medicine. It has been reported that 83.8% of physicians prescribe licensed Kampo medicines as part of their daily practice[13].

Despite the widespread interest among physicians towards Kampo, it is true that, until recently, Kampo education in medical schools and university medical departments was inadequate. In 1999, only 38 of Japan's 80 such schools and departments practiced Kampo education. The number gradually rose, and in March 2001 the Ministry of Education, Culture, Sports, Science and Technology published a landmark report on medical and dental education, in which "being able to explain the outlines of Wakan [Kampo] medicine" was mandated as one of the educational goals of undergraduate education. Since 2004, all 80 Japan's medical schools and departments have included Kampo education[14].

Since abdominal palpation is such a key diagnostic method, instruction therein is always a part of workshops and lectures aimed at training doctors in the use of Kampo in clinical practice[15]. Training in the ways of applying pressure and in how to interpret the sensations experienced in the hands is very difficult, since a great deal depends on the subjective sensations and skill of the operator. In addition, many of the subjects are healthy, and thus it is impossible to make sure trainees will encounter all the patterns typically encountered in clinical practice.

To address these issues, in recent years simulators have been used in medical education, and there are reports of their effectiveness[16,17]. However, Kampo medical education in Japan is still in its infancy, and simulators for abdominal diagnosis did not exist until very recently. Accordingly, we developed such a simulator, called the Fukushin simulator, for use in abdominal palpation education[18].

Doctors attending educational sessions on abdominal palpation have reported that using our existing simulator enables them to make more practical sense of the concepts that remained abstract after listening to explanations and reading handouts, and that they were able to get a better grasp of where to apply pressure when actually conducting abdominal palpation themselves. Indeed, 58.4% of attendees have reported very good or good understanding of abdominal palpation after such educational sessions, and 77.2% responded that the simulator was either useful or very useful[19].

With regard to the models discussed in the present paper, we asked Kampo educators to use them for conducting abdominal palpation and to evaluate them. We received several suggestions for improvement, which we have tried to incorporate into revised versions, but even in their present state 78.6% of the educators judged the simulator to be useful or extremely useful[20]. In short, our existing Fukushin simulator is judged useful by both educators and those receiving education[21].

Thus, it seems clear that simulators are a highly useful tool in training practitioners in the recognition of standard physiological signs. In abdominal palpation, a simulator can help a practitioner learn to recognize signs through actually making physical contact that it is impossible to describe adequately with words and pictures alone.

In order to spread Kampo medicine internationally, it is necessary to standardize abdominal palpation. We consider that the availability of a simulator that can reproduce the standard abdominal patterns is a necessity for such standardization.

CONCLUSION

We have developed a simulator called Fukushin simulator including abdominal models, which represent typical Kampo abdominal patterns, to help in the teaching of abdominal palpation, an important diagnostic method in Kampo medicine.

We developed models aimed at reproducing different abdominal strengths, ranging from weak resistance to palpation, representing a deficiency pattern, to a strong resistance, representing an excess pattern. Using materials such as urethane foam, polyester, and nylon, we were able to create five models representing five gradations of abdominal strength.

We have high hopes that the Fukushin simulator will prove useful in Kampo education and in moving towards standardization of the Kampo diagnostic method of abdominal palpation.

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CONCLUSION

We conducted a questionnaire survey in which doctors learning Kampo medicine ("learners") and medical faculty engaged in Kampo education ("educators") gave us their reactions to the Fukushin Simulator.

No significant difference between educators and learners in terms of their evaluations of usefulness or interest were found; accordingly, we judged that both groups have similarly high expectations of the simulator.

Considering the still immature state of Kampo education in Japan and the attendant paucity of pedagogical tools, we consider the Fukushin Simulator to be a useful contribution in promoting and improving abdominal diagnosis, and, incorporating feedback garnered in this study, we will continue to develop and improve it.

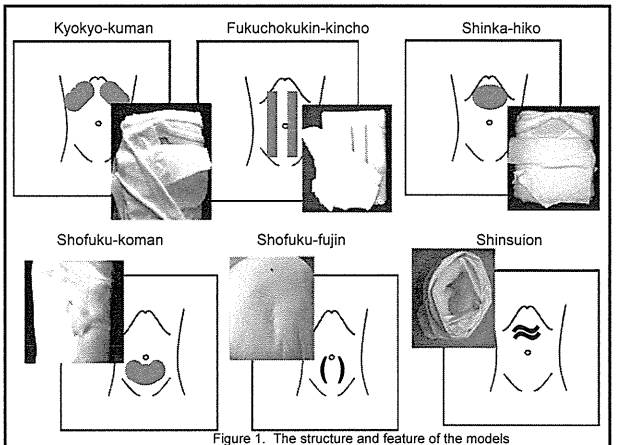


Figure 1. The structure and feature of the models

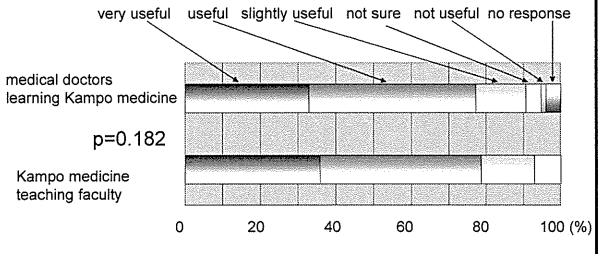


Figure 2. The evaluation of the uselulness about the simulator by learner or educator

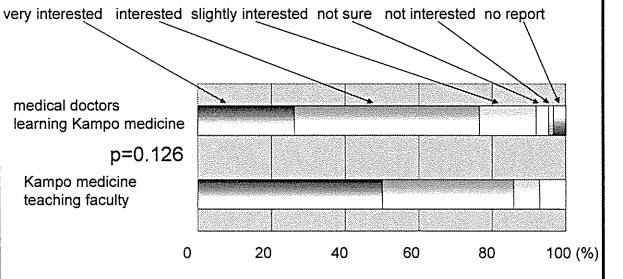


Figure 3. The evaluation of the interest about the simulator by learner or educator

Abdominal pattern model	Materials & Structure
Kyokyo-kuman	polyurethane fixed to artificial ribs in lower hypochondrium
Fukuchokukin-kincho	rubber-coated materials in area corresponding with rectus abdominis
Shinka-hiko	hard polyurethane in area of resistance in epigastric region
Shofuku-koman	hard polyester in area of resistance in lower abdomen
Shofuku-fujin	soft inner cotton in central lower abdomen
Shinsuion	rubber balloon containing water in abdomen

Table 1. The abdomonal pattern of the modell

資料　4

日本の伝統医学を標準化するための努力

日本大学医学部内科学系統合和漢医薬学分野
矢久保修嗣

平成25年3月10日

●日本の伝統医学を標準化する

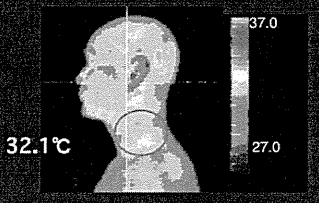
■漢方を自律神経活動で評価する
- 葛根湯
- 腹証

■腹診シミュレータの作成
- 開発の経緯とその評価
- 腹診シミュレータのこれから

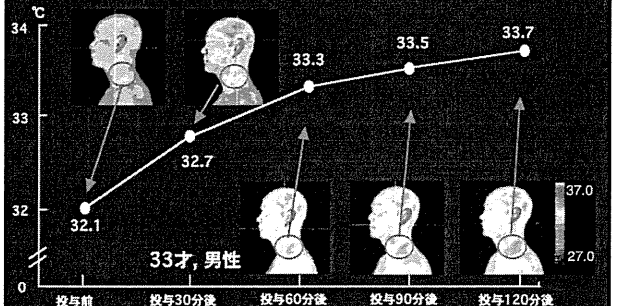
■ICD(疾病及び関連保健問題の国際統計分類)
- 用語および病名分類委員会の活動
- これからフィールドトライアル

●葛根湯による肩こりの改善効果の検討

●葛根湯の内服による肩こりの改善の検討
●サーモグラフィーによる頚部体表温の変化
●男性 12例，女性 7例（20～55才）



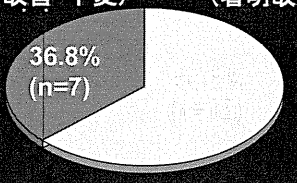
●葛根湯による頚部体表温の変化



●葛根湯による肩こりの改善率

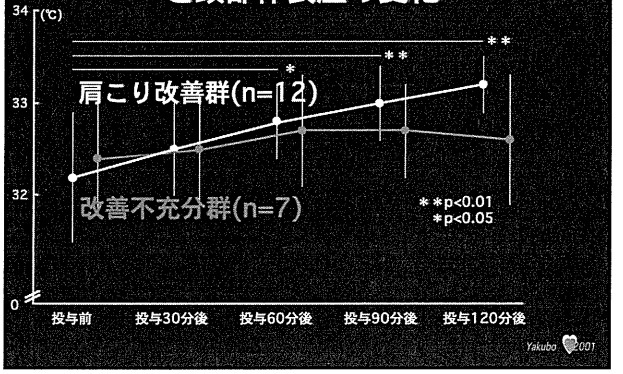
●改善不充分
（やや改善・不変）

●肩こり改善
（著明改善・改善）



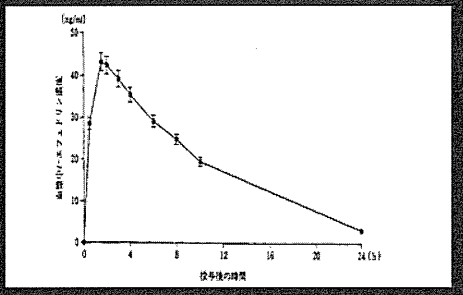
●葛根湯の内服による肩こりの改善の検討(n=19)

●葛根湯による肩こりの改善効果と頚部体表温の変化



●エフェドリンの血中濃度の推移

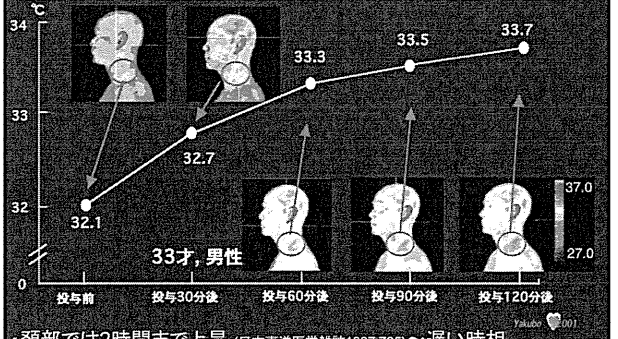
・健常成人8名に葛根湯エキス剤5.0gを空腹時に投与後の血漿中 ℓ-エフェドリン濃度の推移を検討した
＊ℓ-エフェドリン濃度は投与後1.5時間にピーク



本谷宣彦: Prog.Med.20,121,2000

●葛根湯による頚部体表温の変化

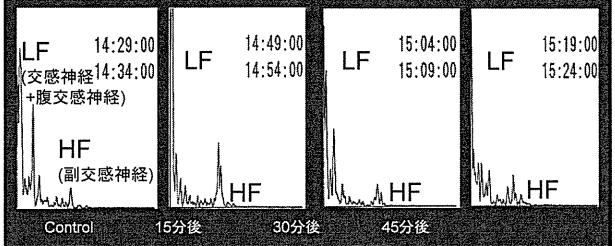
・顔面では15分で最高値(吉田ら,日東医誌1989,179)～早い時相



・頚部では2時間まで上昇 (日本東洋医学雑誌1997,795)～遅い時相
→葛根湯は内服の経過時間により作用発現部位が異なる

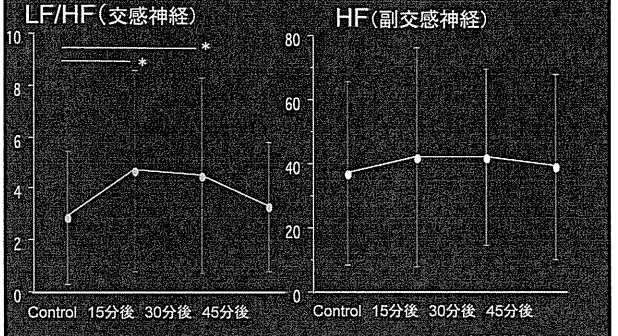
●葛根湯の心拍変動に対する作用

・Cardy301による5分間のFFT解析



・15分後には、眼瞼が熱くなり、重く感じた
・30分後には、頭がボーっとし、眠くなった
・45分後には、肩周辺があたたかくなったような気がする
～自分の感想

●葛根湯の心拍変動に対する作用

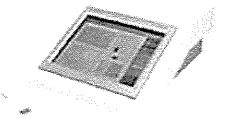


＊<0.05 (Wilcoxon)
n=5

●腹診所見と自律神経活動

■対象
・日大板橋病院を受診した55名，男性18名　女性37名
16～64歳(44.6±11.9)

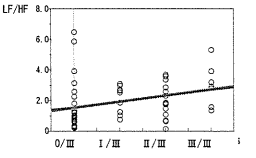
■腹診所見から
・胸脇苦満の部位数　0～2
・胸脇苦満の重症度　0～Ⅲ



■自律神経機能評価
・東京医研社製SA-3000により左第2指の指尖脈波を，安静座位の10分間の記録
・LF成分：0.04-0.15Hz，HF成分：0.15-0.40Hz
・交感神経機能～LF/HF
・副交感神経機能～HF

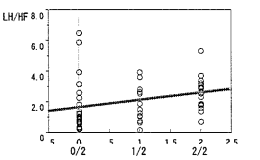
●胸脇苦満と交感神経活動の相関

■胸脇苦満の強度



Y=0.375X+1.632
R^2=0.087
p=0.002

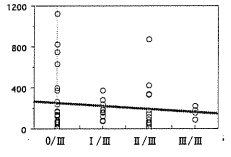
■胸脇苦満の部位数



Y=0.515X+1.575
R^2=0.103
p=0.001

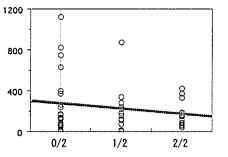
●胸脇苦満の副交感神経活動の相関

■胸脇苦満の強度



Y=−35.084X+260.621
R^2=0.029
p=0.608

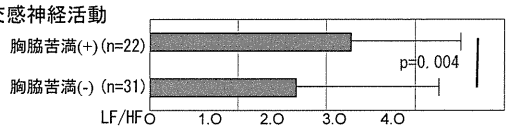
■胸脇苦満の部位数



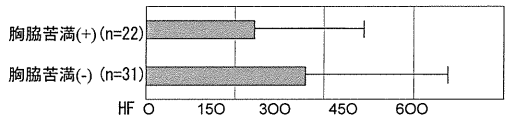
Y=−52.51X+269.766
R^2=0.040
p=0.548

●胸脇苦満の有無と自律神経活動

■交感神経活動



■副交感神経活動



●胸脇苦満と自律神経活動のまとめ

■胸脇苦満は
- 肝障害
- 横隔膜付近の炎症
- ストレス？

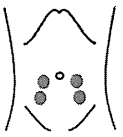
■私たちの検討から
- 胸脇苦満の重症度と交感神経活動は正相関
- 胸脇苦満の部位数と交感神経活動は正相関
- 胸脇苦満の存在は交感神経活動の亢進

●瘀血の圧痛の評価

■腹診は成書の方法にしたがった（n=56）.

■左右の臍傍，回盲部，S状結腸部の圧痛の重症度は4段階
- 圧痛が認められない： 0/Ⅲ
- 軽度に認める　　： Ⅰ/Ⅲ
- 明らかに認める　　： Ⅱ/Ⅲ
- より顕著　　： Ⅲ/Ⅲ

■左右の臍傍，回盲部，S状結腸部で部位数を5段階
- 圧痛が認められない：0/4
- Ⅰ/Ⅲ以上が1箇所　：1/4
- 2箇所　：2/4
- 3箇所　：3/4
- 全4箇所　：4/4



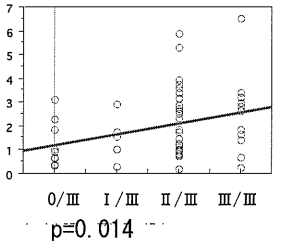
●瘀血の圧痛の評価結果

・瘀血の圧痛の重症度			・瘀血の圧痛の部位数	
明らかな瘀血の圧痛(−)	0/Ⅲ：	9	0/4：	9
	Ⅰ/Ⅲ：	7	1/4：	10
明らかな瘀血の圧痛(+)	Ⅱ/Ⅲ：	27	2/4：	17
	Ⅲ/Ⅲ：	13	3/4：	10
			4/4：	10

- 相関関係：Spearmanの相関係数
- 有意差検定：Mann-Whitney検定

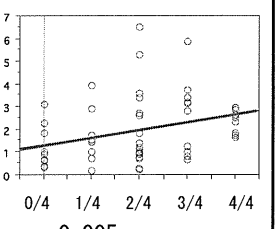
●瘀血の圧痛と交感神経活動の相関

・瘀血の圧痛の重症度



p=0.014
r=0.332
y=0.46x+1.21

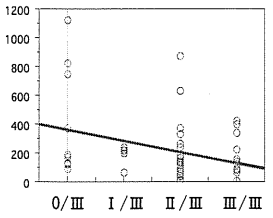
・瘀血の圧痛の部位数



p=0.005
r=0.381
y=0.333x+1.35

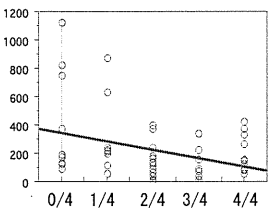
●瘀血の圧痛と副交感神経活動の相関

- 瘀血の圧痛の重症度



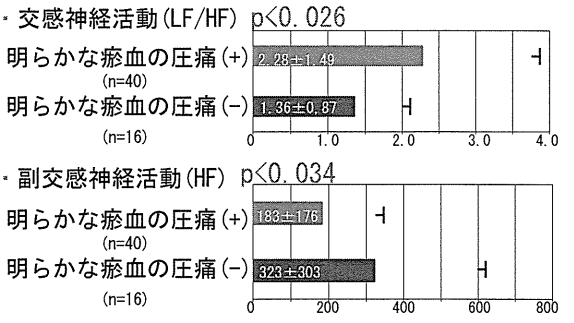
p=0.102
r=0.220
y=-73.07x+353.77

- 瘀血の圧痛の部位数



p=0.059
r=0.255
y=-58.86x+343.11

●明らかな瘀血の圧痛の存在と自律神経活動



● 結　語

- 交感神経活動との相関は，瘀血の圧痛の重症度(p=0.014)や，その部位数(p=0.005)がみられた.
- 瘀血の圧痛の存在は，交感神経活動の亢進，副交感神経活動の低下を示唆するものと考えられた.

＊腹診所見はこれだけで説明できるものではない.
➡腹診所見には，もっと重要な臨床的意義がある

●腹診学習・教育ついて

- 腹診について“入門漢方医学”(日本東洋医学会編集)は，漢方的な腹部の名称を知ることと，臨床的意義を持つ代表的腹証の理解が必要.
- 腹診は重要な診察法なので，腹診に関する教育が必要.
- 腹診時の術者の手指の動きや，圧迫する圧力やそのとき手に得られる抵抗感などの習得は，術者の感覚的な問題も存在するためかなり困難である.
- 患者にみたてた健康人を対象として，腹診の練習を行っても，典型的な臨床的意義のある腹証を全て用意することは不可能である.

●腹診シミュレータの企画

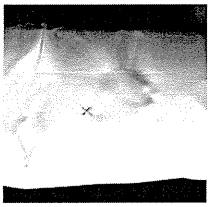
- 腹診は手の触覚という感覚～話だけでは…
- 典型的な所見の準備は…
- 腹直筋緊張，心下痞鞭，胸脇苦満，小腹硬満，小腹不仁，心下部振水音の所見をもつ6個の腹部模型

●腹診シミュレータ(ver.1)の作成

- 成人実物大の腹部のみ～剣状突起部付近から臍下約20cmまでの腹部のみで構成される腹部模型
- 素材は可塑性のある特殊ポリエステル系樹脂，人工皮革，パイル生地，綿，木綿生地，ジャージ，ポリウレタン，天然ゴムなど
- 腹部の特徴的な所見にあわせて各種の硬度の異なる材料を設置
- 人体が様々な組織の層構造でできていることを考慮し，素材を重ねた.

・小腹鞭満モデル

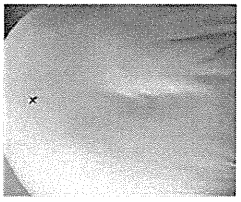
・小腹鞭満：下腹部の馬蹄形抵抗
・小腹鞭満モデル：下腹部の馬蹄形抵抗感



・楕円形状(140×105㎜)のやや硬めのスポンジの短径側に20㎜の切り欠きを加え，形をなめらかに整形し馬蹄形の膨隆と抵抗感を表現した

●小腹不仁モデル

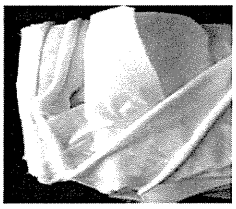
・小腹不仁：下腹部正中の緊張低下，腹直筋の緊張（小腹拘急）下腹部の抵抗感減弱，知覚の低下
・小腹不仁モデル：下腹部正中の緊張低下感



・下腹部正中部のスポンジに楕円形(20×150㎜)の切り欠きを作成し，触診した際に同部位の抵抗感が減弱しているようにした

●胸脇苦満モデル

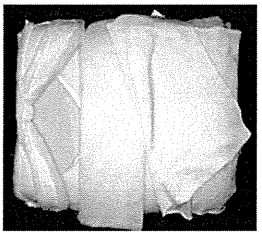
・胸脇苦満：季肋下部の抵抗・圧痛
・胸脇苦満モデル：季肋下部の抵抗感



・左右の季肋部を圧迫したときの抵抗感を，楕円形(100×200×20㎜)のやや硬めのウレタンを使用．肋骨下に術者の指が入らないように，肋骨にしっかりと固定

●心下痞鞭モデル

・心下痞鞭：心窩部の抵抗・圧痛
・心下痞鞭モデル：心窩部の抵抗感



・樹脂で作成した肋骨で囲まれた心窩部に楕円形(15×25×25㎜)のやや硬めのウレタンをおいた

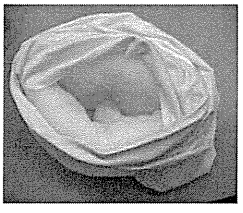
●腹直筋攣急モデル

・腹直筋攣急：腹直筋の緊張を触れる
・腹直筋攣急モデル：腹直筋の抵抗感

・天然ゴムで被覆したもの(500×100×50㎜)を2本使用して，触診した際の抵抗感を表現

●振水音モデル

・振水音：心窩部の拍水音
・振水音モデル：心窩部の拍水音



・内部に水(50ml)と空気(150ml)を入れたゴム風船を，柔らかい腹部モデルの心窩部に置いて作成

●漢方学習者による腹診シミュレータに対する評価

■医師を対象とする漢方医学講演会(11回)の腹診学習において，我々はこの腹診シミュレータ(Ver.1)を実際に使用し，参加者にアンケート調査をおこなった．

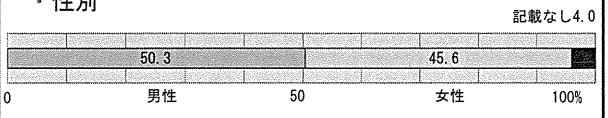
'05.10.16：大分　'05.10.29：和歌山　'05.11.27：金沢
'05.12.10：高知　'06.3.5：鹿児島　'06.4.23：沖縄
'06.5.28：新潟　'06.6.10：つくば　'06.9.2：名古屋
'06.11.12：青森　'07.3.11：大阪

■149名の医師より無記名のアンケートの回答を得た．
- 腹診シミュレータに実際にふれてみて～興味？
- シミュレータによる腹診の理解は？
- シミュレータの有用度は？

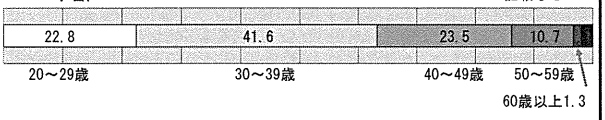
漢方医学的腹診学習用シミュレータに対する学習者の評価，医学教育 40，55-60，2009

●参加者について

- 性別



- 年齢

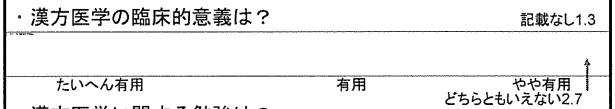


(n=149)

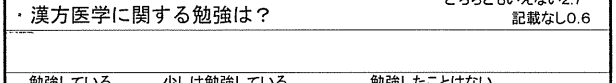
●漢方医学について

- 漢方医学の興味？

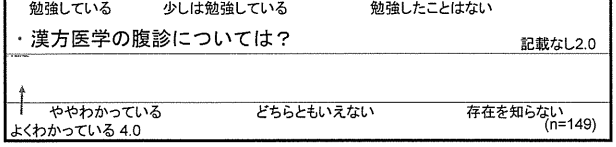
- 漢方医学の臨床的意義は？



- 漢方医学に関する勉強は？



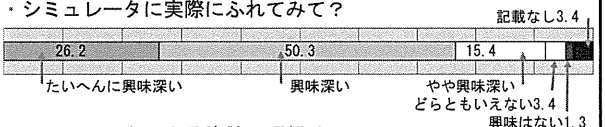
- 漢方医学の腹診については？



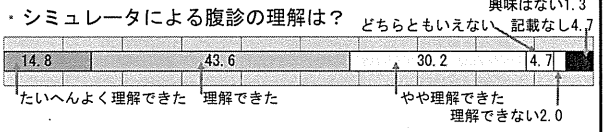
(n=149)

●腹診シミュレータの感想

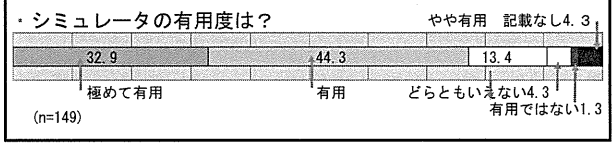
- シミュレータに実際にふれてみて？



- シミュレータによる腹診の理解は？



- シミュレータの有用度は？

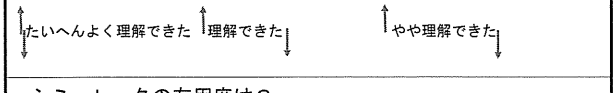


(n=149)

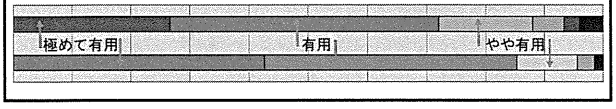
●腹診シミュレータの感想～男女差

- シミュレータに実際にふれてみて？　Mann-Whitney's U test p=0.03

- シミュレータによる腹診の理解は？　p=0.19



- シミュレータの有用度は？　p=0.03



●腹診くん(ver.2.0)の作成

- 腹診シミュレータ作成を業者に委託し，改良型する（Nubic研究助成）
- 腹診シミュレータの各モデルの基本的な構造を決定し，それに基づいて漢方医学的に重要な所見モデルを作成する．
- 腹直筋緊張，心下痞鞕，胸脇苦満，小腹硬満，小腹不仁，振水音の所見をもつ6個の腹部モデルを作成する

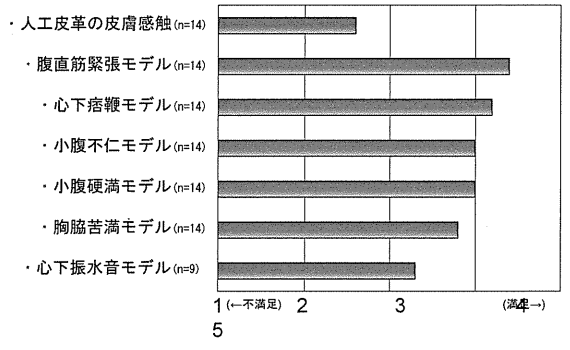
●腹診くん(ver. 2. 0)の作成

- 腹診シミュレータの腹力3/5となるように基本的な構造を決定し，それぞれの所見モデルを作成.
- 振水音モデルにゴム製の氷枕を使用．腹力が不適切，かつ，音が出ないため旧タイプを使用.

●腹診シミュレータに対する教育担当者による評価

- 腹診シミュレータ(Ver. 2. 0)に対する大学における漢方医学教育担当者に本シミュレータに関する無記名のアンケート調査を行った.
- それぞれの6つの腹部所見に満足(5点)～不満足(1点)の5段階で評価を行った.
- 回答を得た14名中に，漢方の臨床経験6～25年の日本東洋医学会認定専門医10名が存在.

●漢方医学教育担当者による評価



●アンケートの自由記入

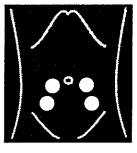
- 学生にはわかりやすい.
- なかなかよい.
- 皮膚表面がかたくゴワゴワしている.
  皮膚とは思えない．よくできているが，もうひと工夫して欲しい.
- 鼠径部の位置を表示した方がよい.
- 所見を組み合わせたものも必要.
- 圧痛点の確認のため音がするとよい.

などの意見がみられた.

腹診学習用シミュレータに対する漢方医学教育担当者による評価
(第41医学教育学会，2008)

●圧痛モデルの作成(ver. 2. 1)

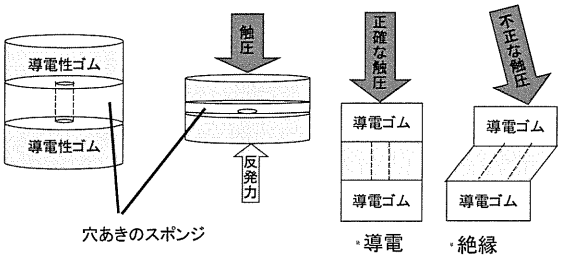
- 臍傍・下腹部の抵抗圧痛モデル作成の検討をおこなった.
  ～圧痛所見の装置の開発.
  - 臍の斜め2横指外方の腹直筋上の硬結
  - 脊椎に向けて指頭で圧迫すると激しい放散痛
  - 回盲部，S状結腸部の抵抗・圧痛



腹診教育用シミュレータの開発．日本東洋医学雑誌59, 595-600，2008

●圧痛モデルの作成(ver. 2. 1)

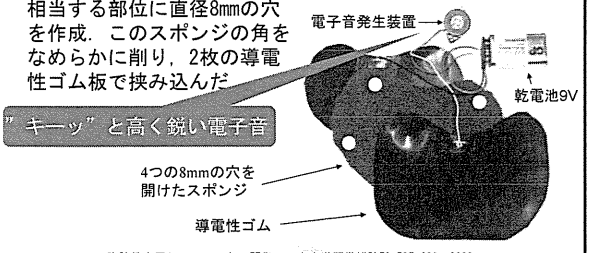
- 圧痛モデルのために特殊なスイッチを作成



腹診教育用シミュレータの開発．日本東洋医学雑誌59, 595-600，2008

●圧痛モデルの作成(ver. 2. 1)

- シリコーンの導電性ゴムS60(鬼怒川ゴム社製).
- 厚さ0. 5mmのものを馬蹄形に形成，同じ形で厚さ10mmの導電性のないスポンジの臍傍，回盲部，S状結腸部の圧痛点に相当する部位に直径8mmの穴を作成．このスポンジの角をなめらかに削り，2枚の導電性ゴム板で挟み込んだ



腹診教育用シミュレータの開発．日本東洋医学雑誌59, 595-600, 2008

●圧痛モデルの作成(ver. 2. 2)

- 腹診時に圧迫する力を関知するスイッチの大きさは直径が1cm，2cmの2種類を用意.
- スイッチの抵抗感に関しては，内部に組み込むスプリングの強さなどにより3種類を用意.
- これを腹部モデルの下腹部にある4箇所の圧痛点に相当する位置に設置した.
- 圧痛による「痛い」という声を表現するため，5秒間のボイスレコーダを設置した.
- スイッチが一旦はいると，すぐに「痛い」という声を再生するように女性の声で録音した.

●圧痛モデルの作成(ver. 2. 2)

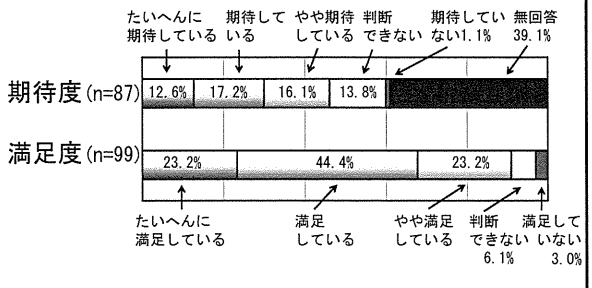
- 圧迫する力を関知するスイッチは，直径1cmで，かつ圧迫する抵抗の小さいものを使用.

腹診シミュレータにおける瘀血の圧痛点刺激に対する音声反応装置の作成
(第42医学教育学会，2009)

●“腹診実習”に対する学生の感想

- 腹部の所見などは初めてだったのですが，実際に自分たちでやってみることによって，頭に残るので，とても良かったです.
- 腹診を実際に体験できて感触を知ることができた.身をもって体験できた.
- 五感を使う実習なので，頭に入りやすい.
- 講義よりもわかりやすかった.
- 触診できるマクラ（？）は，大変すばらしかった.

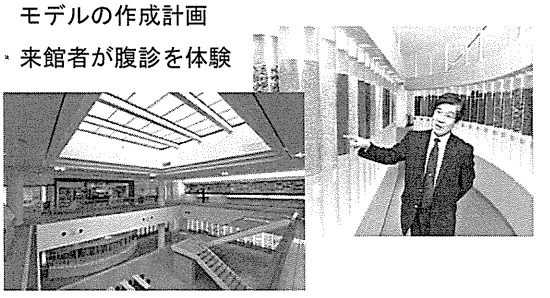
●漢方医学の授業に対する学生の思い



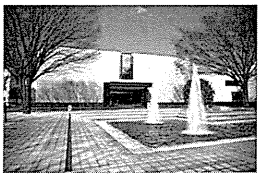
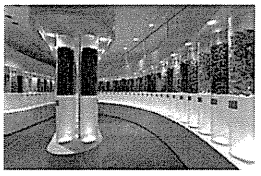
漢方医学の授業に対する開始時の期待度/終了時の満足度？

●ツムラ漢方記念館の腹診くん(ver. 3. 0)の企画

- ツムラ漢方記念館(松下清孝 館長)より腹診モデルの作成計画
- 来館者が腹診を体験



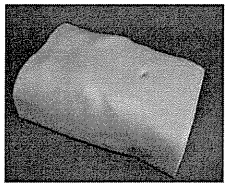
●ツムラ漢方記念館

- 財団法人日本産業デザイン振興会が主催する2008年度グッドデザイン賞を受賞.
- 創業115周年メモリアル事業のひとつとして2008年4月に全面リニューアルオープン.
- 漢方・生薬に特化した世界で唯一の記念館として『漢方』のことを分かりやすく，親しみやすく伝える
- 漢方の歴史，生薬の標本，最新の研究発表等の展示により漢方に関する情報を発信

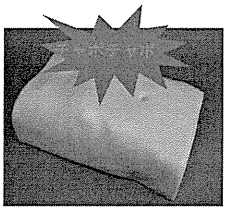
●腹診くん(ver. 3.0)の作成

- 基本的な素材構造として硬質な樹脂製のベース(基板)に，ＦＲＰ製の助骨・胸骨，骨盤，内蔵は主に化繊綿．表皮は実際の男性の腹部を型取りし，柔軟性のある樹脂にて成型.
- 表皮部材の内側に“特殊な複合素材”を覆うことにより，実際の人体の表皮がずれる感覚が得られる.
- 基板に複数の通気孔を設け，四隅に脚を付けて，下部に空間をつくり，内部の空気が下方に逃げる.
- 実際の人体に似た感覚が得られる.



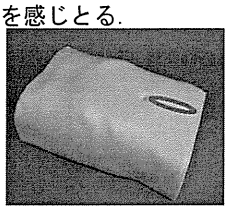
●振水音モデル

- 水の入った袋を心下の位置の基板に固定
- 袋の中の水は粘性も考慮，かつ腐敗しにくいもの.
- 水と空気の割合も調整し，音の響く割合
- 基板の下側に２本の金属製のレールを下駄状に取り付ける



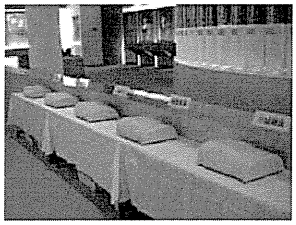
●小腹不仁モデル(ver. 3.0)

- 下腹部の中心部分の皮下部補強調整部材の内側に長方形の深さ数㎜程度の溝を形成し，ここに化繊綿をはめ込むことでこの部分の強度（抵抗力）が補強部材に比べ小さくした．外部より圧迫した場合に抵抗の弱い部分を感じとる.



●ツムラ漢方記念館使用腹診くん(ver. 3.0)の完成(2012年春)

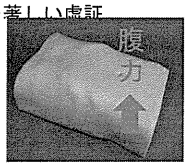
- 腹力3/5として心下痞鞕，胸脇苦満，小腹不仁，小腹鞕満の腹部モデル



- 腹力の弱い振水音モデル ～不充分：最近改良

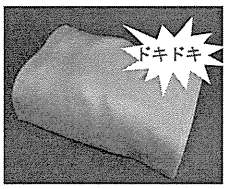
●腹診くん腹力モデル(ver. 3.1)の作成

- ５種類の腹力モデルは腹部の抵抗感について段階的に表したもの.
- 腹力１が最も抵抗感が小さく，腹力５が最も抵抗感が大きい.
- 腹力モデル：腹力１（腹部陥凹）～著しい虚証
- 腹力モデル：腹力２～虚証
- 腹力モデル：腹力３～中間証
- 腹力モデル：腹力４～実証
- 腹力モデル：腹力５（腹部膨隆）～著しい実証



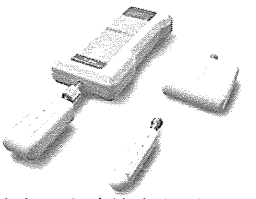
●腹部動悸モデル(ver. 3. 1)

- 電動モーターを含む動悸発生装置を配置.
- 動悸発生装置は電動モーターによる上下動するプラスチックの棒から構成される.
- プラスチックの棒が上下運動することにより動悸の振動が生じる.
- モーターの回転数は70rpm程度に調整



●腹診所見の臨床検査による評価

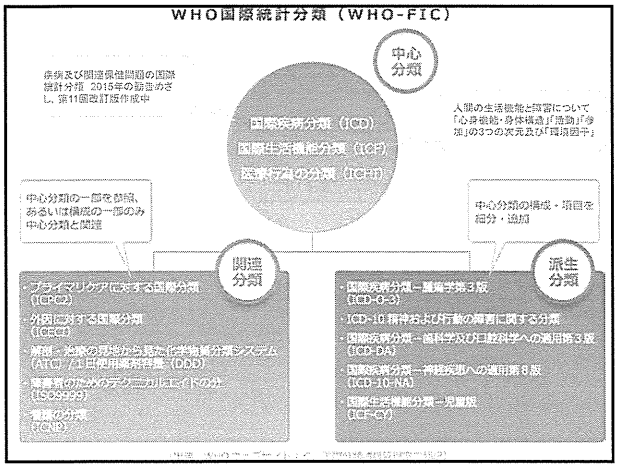
- 腹診所見は感覚的なもの
  ～抵抗感
- 腹部の圧を測定する試み
  ～腹部は均一ではない



- 腹部X-P検査，腹部超音波検査，血液検査などでも腹診所見の評価は困難

●腹診シミュレータのこれから

- 腹診所見は方剤の決定，証の決定にたいへんに重要
  ～日本漢方の特徴
- 腹証の他覚化，臨床検査における評価は困難
  ～腹部の内部は一定ではない，手は優れている
- 腹直筋緊張モデル(ver. 3. 2)の作成
- 触診圧測定・圧痛モデル
  ～名医の触診圧の記録
- 標準化モデルの作成



●ICD-11WHO国際統計分類協力センター

Collaborating Centre for the WHO-FIC in Japan

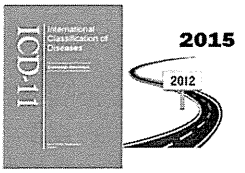
- 2011年９月９日付けでWHO西太平洋地域事務局から指定
- 厚生労働省大臣官房統計情報部企画課国際分類情報管理室
  国立保健医療科学院研究情報支援研究センター
  国立がん研究センターがん対策情報センター
  がん情報・統計部
  日本病院会日本診療情報管理学会
  日本東洋医学会用語及び病名分類委員会
  （日本東洋医学サミット会議JLOM）
  の統合体
- WHO-FICネットワークは2013年1月現在，17協力センター

●ICD-11の特徴

■電子化
- 本体の言語は英語，使用の際は各国語
- 用語のリンク

■臨床の専門家がTAG
- かつては統計の専門家
- 現場の意向が反映される

■第23章伝統医学が加わる
- 近代医学は地球人口の数%以下
- 伝統医学に関する整備が必要



World Health Organization

●ICD-11の用語に関する議論

- 各国が必要なものは残す（ISTは2ヵ国の使用）
- 本体の言語は英語
- 用語は意味を明らかにする内容
- 音の表現はしない（Yin, Yang, Qiのみ使用）
- 数字は使用しない（Type1, stage 1は不可，でも‥）
- 近代医学用語は使用しない（syndrome, diseaseなど）
- 中医病名（消渇，コレラ，心悸など）は Traditional Medical Disorders(TM)
- 伝統医学の証は，Traditional Medical Patterns
- JCKの伝統医学はModule 1

World Health Organization

●ICD-11の内容

■Traditional Medical Disorders(TM)

■Traditional Medical Patterns(TM)

1. Principal Based Patterns(TM)：寒熱・虚実など
2. Body Constitution patterns(TM)：気血水など
3. Organ Sysytem Patterns(TM)：五臓
4. Environmental Patterns(TM)：外因
5. Meridian Patterns(TM)：経絡
6. Six Stages Patterns(TM)：六病位
7. Triple Energizer Patterns(TM)：三焦弁証
8. Four Phase Patterns(TM)：温病
9. Four Constitution Medical Patterns(TM)：四象医学
10. Formula Patterns(TM)：薬方の証

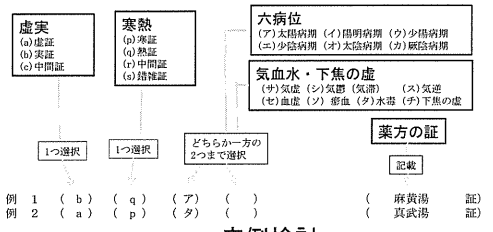
World Health Organization

●日本漢方のコーディングルール

- 近代医学病名（1~22章）+伝統医学診断
- 急性感染症と慢性疾患に分ける
- 急性感染症は六病位と虚実・寒熱を診断（6×12）
- 慢性疾患は虚実・寒熱のみ（6×12），あるいは虚実・寒熱に気血水・下焦の虚（7×12）
- 治療に用いるべき漢方薬の薬方の証（146種類）

World Health Organization

●ICD-11第23章伝統医学・漢方コード用紙



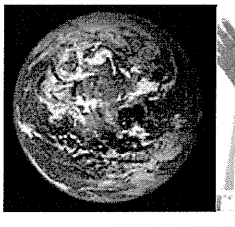
例 1 （ b ） （ q ） （ ア） （ ） （ 麻黄湯 証）
例 2 （ a ） （ p ） （ タ） （ ） （ 真武湯 証）

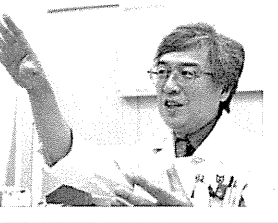
症例検討

症例 1 （ ） （ ） （ ） （ ） （ ）
症例 2 （ ） （ ） （ ） （ ） （ ）
⋮
症例10 （ ） （ ） （ ） （ ） （ ）

● ま と め

- 腹診シミュレータによる腹診教育，所見の標準化
  ～例えば，この抵抗を腹力3/5
  このくらいの抵抗であれば心下痞鞕3/3
  など，感覚を標準化する
- Kampoが世界に～腹診シミュレータが世界標準に





資料　5

Making of a simulator for the standardizing of abdominal strength pattern in the Kampo styl

自主創造

Shuji Yakubo(1,2), Yukiko Ueda(1,2), Naomichi Tanekura (1), Takao Namiki(3), and Hiroshi Ota(4)

(1) Division of Integrated Herbal Medicine, Department of Medicine, Nihon University School of Medicine. Tokyo, Japan.
(2) Kampo Institute in Japan, Tokyo, Japan.
(3) Department of Japanese-Oriental (Kampo) Medicine, Graduate School of Medicine, Chiba University. Chiba, Japan.
(4) Application Producers Qualifying Team, Local Activities Promotion Group, Japan Invention and Innovation Institute. Tokyo, Japan.

○Introduction1

Abdominal palpation is a system of diagnosis used in Kampo medicine, unique to Japan, designed to discern the patient's "abdominal pattern" of systemic physical disorder. In this system, the physician applies pressure with his or her hand to the patient's abdominal area, and evaluates the patient's reaction to the touch and the sensation transferred to the hand. This method is based on the Kampo theory that physiological changes arising from disease will manifest themselves in the abdomen, and is used in clinical practice to diagnose all kinds of disorder.

The de facto textbook of Kampo medicine, Introduction to Kampo, edited by the Japan Association for Oriental Medicine, stipulates that those learning Kampo medicine must know the term abdominal palpation in Kampo style (Fukushin in Japanese) and understand the representative disease patterns of clinical significance.

Depending as it does on precise movements of the fingers and on the subjective sensations experienced by the practitioner, abdominal palpation in Kampo style is hard to learn and hard to standardization.

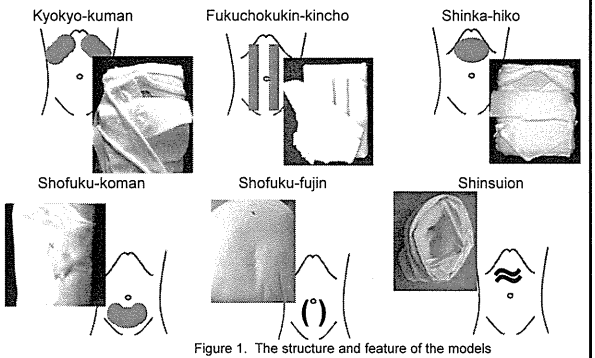


Figure 1. The structure and feature of the models

○Introduction 2

In recent years, simulators have come to be used widely in medical education, and have garnered favorable evaluations. However, efforts in developing a simulator for abdominal palpation have hitherto been inadequate, and indeed there has been no such simulator developed in Japan. For the previous study, we developed a simulator for teaching abdominal palpation, which is Fukushin Simulator consisted 6 models.

In the present study, we have tried to develop an abdominal diagnosis simulator abdominal strength pattern model to educate and standardize abdominal pattern.

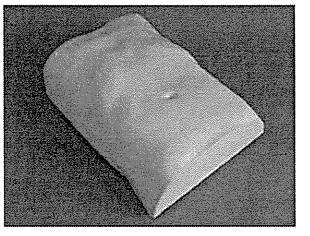
○Materials and Methods

The 5 models constructed from polyester-type synthetic plastic, silicone rubber, arboreous cotton, polyurethane, and other materials.

Our new Fukushin Simulator consists of 5 abdominal strength pattern models, designed to recreate 5 abdominal strength patterns: from strong abdominal strength pattern (Fukuryoku 5) to weak abdominal strength pattern (Fukuryoku 1).

○Results1

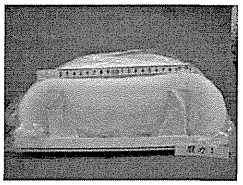
The 5 models represent the adult human abdomen at actual size from the chest to 20 cm below the navel covered with silicone rubber, constructed from polyester-type synthetic plastic, arboreous cotton, polyurethane, and other materials. Artificial ribs, made of polyester-type synthetic plastic FRP, form the frame, to which the aforementioned materials of varying hardness are affixed.



○Results2

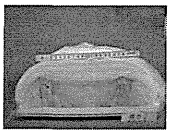
Our new Fukushin Simulator consists of 5 abdominal strength pattern models, designed to recreate 5 abdominal strength patterns: strong abdominal strength pattern with upheaval abdominal style (Fukuryoku 5), slight strong abdominal strength pattern (Fukuryoku 4), intermediate abdominal strength pattern (Fukuryoku 3) which is set at the intermediate point on a strong-weak scale of abdominal strength., slight weak abdominal strength pattern (Fukuryoku 2), weak abdominal strength pattern collapsed abdominal style (Fukuryoku 1).

Fukuryoku 1: weak abdominal strength pattern collapsed abdominal style

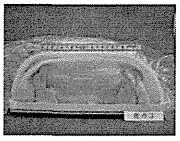


○Results3

Fukuryoku 2: slight weak abdominal strength pattern



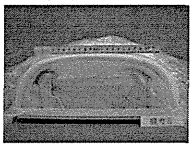
Fukuryoku 3: intermediate abdominal strength pattern



○Results4

Fukuryoku 4: slight strong abdominal strength pattern

Fukuryoku 5: strong abdominal strength pattern with upheaval abdominal style



○Discussion1

In today's Japan, modern western medicine is the standard paradigm. Many Japanese doctors are, however, aware of limits to this paradigm, and have high expectations of Kampo medicine. It has been reported that 86.3% of Japanese doctors have experience of prescribing Kampo formulas.

Unfortunately, until recently provision of Kampo education has been inadequate. The report of the March 27, 2001 Ministry of Education, Culture, Sports, Science and Technology's Council on the Future of Medical & Dental Education contained in its list of goals for those graduating from such programs that they "should be able to describe Wakan (Japanese-style Kampo) medicine". From 2004, every medical school and department in Japan has included Kampo education in its curriculum.

Since Kampo education in Japan can still be described as being in its infancy, teaching tools are still rather scarce. To promote and standardize Kampo education, the Japan Society for Oriental Medicine published in 2007 Kampo Medicine for Students. This book contains explanations of the techniques of abdominal palpation, along with illustrations and descriptions of the representative disease patterns. Recent initiatives have also attempted to realize teaching efficiencies by using computers as teaching tools.

○Discussion2

The development and design of our Fukushin simulator, which incorporates 6 abdominal models, is described in the previous paper. In the study, some doctors experiencing Kampo education using the simulator reported that the concepts that remained abstract when explained through lectures and paper handouts became concrete through the abdominal models, and they were thus able to understand the sites that they should concentrate on in their diagnosis.

In the present study, we have tried to develop an abdominal diagnosis simulator abdominal strength pattern model to educate and standardize abdominal pattern because those who educators and learners hope to realize the abdominal strength pattern models.

In the future we are hoping to incorporate movement such as palpitations into the models. In addition, we hope to develop a variable model, incorporating materials that can be manipulated to alter hardness at key sites and include a remote control device that would allow us to change settings. Other planned improvements include a system to evaluate the pressure applied by a physician attempting abdominal diagnosis by means of pressure sensors.

○Conclusion

Abdominal palpation is a system of diagnosis used in Kampo medicine, unique to Japan, designed to discern the patient's "abdominal pattern" of systemic physical disorder. In this system, the physician applies pressure with his or her hand to the patient's abdominal area, and evaluates the patient's reaction to the touch and the sensation transferred to the hand.

But to learn standard phenomenon of abdominal diagnosis pattern is thought to be very difficult, and to evaluate phenomenon of abdominal diagnosis pattern by the clinical examination is thought to be impossible.

In the present study, we have tried to develop an abdominal diagnosis simulator abdominal strength pattern model to standardize abdominal pattern. Our new Fukushin Simulator consists of 5 abdominal strength pattern models, designed to recreate 5 abdominal strength patterns.

Considering the still immature state of Kampo education and standardization in Japan and the attendant paucity of pedagogical tools, we consider the Fukushin Simulator to be a useful contribution in promoting and improving abdominal diagnosis, and, incorporating feedback garnered in this study, we will continue to develop and improve it.

資料　6

腹診シミュレータ腹力モデルと腹部動悸モデルの作成

自主創造

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4) ツムラ漢方記念館

○Introduction

典型的な漢方医学的腹部所見を表現する腹部モデルから構成されている腹診シミュレータの開発を行ってきた（図1）.

既存の腹診シミュレータを改良して，腹力や腹部動悸を教育あるいは標準化するために腹力モデルと腹部動悸モデルを，我々は作成することを検討した.

○Materials and Methods 1

腹部モデルの表面はシリコーンを使用する.
腹部モデルの内部は合成樹脂，ウレタン，スポンジなどを使用する.

胸骨剣状突起上方5cmおよび臍部下方15cmまでの成人男性の腹部を型どりして，シリコンを成形して腹部モデルの腹部表面を覆った(図2).
シリコンは黄色人種の皮膚の色に着色した.
合成樹脂により肋骨，胸骨を作成して胸郭下部を形成した.

○Materials and Methods 2

腹力モデルはウレタン，スポンジを組み合わせて腹部の強い抵抗感から弱い抵抗感を，5段階に表現した.

(図2) シリコーンで覆われた腹部モデル

○Materials and Methods 3

腹部動悸モデルは腹部モデル内部にモータを設置し，その回転運動を上下のピストン運動に変換するようにした.

○Results1

ウレタン，スポンジを組み合わせて中間的な腹力(中間証)を3/5(図3)として作成した.

(図3) 腹力3/5モデルの構造と寸法

○Results2

中間証の腹力3/5を基準として，虚証の腹力は腹部の抵抗感の弱いものを腹力2/5(図4)，著しく弱い腹部抵抗感に腹部の陥凹を伴うものを腹力1/5(図5)として作成した．

(図4)腹力2/5モデルの構造　(図5)腹力1/5モデルの構造

○Results3

中間証の腹力3/5を基準として，実証の腹力は腹部の抵抗感の強いものを腹力4/5(図6)，著しく強い腹部の抵抗感と腹部の膨隆を伴うものを腹力5/5(図7)として作成した．

(図6)腹力4/5モデルの構造　(図7)腹力5/5モデルの構造

○Results4

腹部動悸モデル(図8)は，顕著でもなく，かすかでもない腹部動悸所見を臍上に得ることが可能であった．

(図8)腹部動悸モデルの寸法と構造

○Conclusion

腹診シミュレータ腹力モデルや腹部動悸モデルの使用は，腹診の教育や腹診所見の教育や標準化に役立つことが期待される．

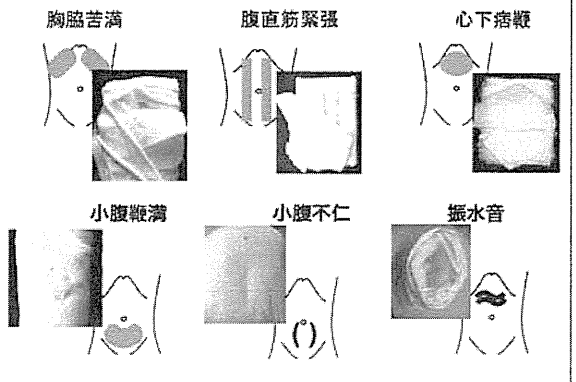

図1．以前に製作した腹診シミュレータとその構造