PRIMARY MEDICAL CARE PART (I)
PERCUTANEOUS LOW FREQUENCY STIMULATIONS AT
ELECTRODERMAL POINTS (=NAKATANI'S RYODOTEN) CONCERNED
TO STIFF SHOULDER AND STIFF NECK (1).

[Observations on the changes of electrodermal points' (= Nakatani's) electricity]

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Introduction

The occurrence of stiff shoulder and stiff neck became so common among men and women of this century. This syndrome or discomfort on shoulders and neck could be due to the strain or tension appeared on shoulder muscles (M. trapezius (upper, middle & lower), M. rhomboideus minor, M. rhomboideus major, M. levator scapulae, M. supraspinatus, M. infraspinatus, M. teres minor & M. teres major etc.) and the neck muscles (M. longissimus capitis, M. longissimus cervicis, M. longissimus thoracis, M. semispinalis capitis, M. semispinalis cervicis, M. semispinalis thoracis, M. spinalis capitis, M. spinalis cervicis & M. spinalis thoracis etc.). Among these shoulder and neck muscles, there were three groups of muscle which usually could cause the shoulder and neck strain or tension. They were (a) M. levator scapular group, (b) M. rhomboideus group, and (c) M. trapezius group.

The disorders of (1) muscular menbrane, (2) muscle tiredness and strain, (3) aging phenomenon, (4) cervical cervis deformity, (5) so-called frozen shoulder, (6) shoulder arm syndrome, (7) cervical tumor, (8) whiplash injury, and (9) visceral organs such as (a) lung, (b) heart, (c) liver, (d) gall stone, (e) gastric ulcer, (f) high blood pressure, (g) low blood pressure, (h) eye, (i) nose & (k) teeth etc. could cause the shoulder and neck discomfort as described by Teramura ①.

Suzuki followed the method of traditional acupuncture ② and the others such as Kondo ③, Nakagawa ④ and Shirai ⑤ used the electrical acupunctures for the control

key words : percutaneous low frequency stimulations, stiff shoulder, stiff neck, traditional acupunctures, electrical acupunctures, electrodermal points' (= Nakatani's) electricity, colorinfrared photography, random impulses, M. levator scapular group, M. rhomboideus group, M. trapezius group, SSP (Hyodo), blotting ring paper, some complications.

of shoulder and neck discomfort. Some physicians and doctors again used the drug therapies of (1) vitamin injection (B_1 , B_6 , B_{12} & C), (2) muscle relaxants (curare & succinyl choline), (3) sympathetic blockers (scopolamine & pavatrine), (4) pain killer or blocker (aminopyrine, phenacetin, phenyl butazone (Butazolidin), predonisone or procain/procain + vitamins), and some traditional herbal compound, Kampo (Kakonto & Tokakushokito) ⑥, ⑦.

However, most patients disliked the acupunctures, drug injections, drinking of medicines and herbal compounds. They preferred to follow the method which did not give any penetration of acupuncture needles or injection needles into their body and the drinking of medicines. Therefore, the following method of percutaneous low frequency stimulations at electrodermal points (=Nakatani's Ryodoten) seemed to be very effective for the control of stiff shoulder and stiff neck from the period of 10 time stimulations. The fees for these stimulations were so cheap and most patients preferred to proceed the therapies for several months.

Materials and methods

(A) **Instruments and procedures** - the instruments and procedures were the same as described ⑧,⑨ except that the silver spike points, Hyodo SSP were used ⑩, and the cycle of low frequency and power control were adjusted as 1 Hz/75 μ V. In this case the percutaneous low frequency stimulations were performed by using the electrical frequency and power control of 4 Hz/300 μ V through out these stimulations.

However, sometimes the SSP could give the contact dermatitis or irritated skin lesions followed by the repeated percutaneous low frequency stimulations. To protect these unnecessary skin injuries and to obtain the good electrical conduction at electrodermal points, some additional **ring blotting papers** soaked in 5% salt solution were used.

(B) **Detections of electrodermal points** (=Nakatani's Ryodoten) - the procedures were the same as described ⑧,⑨.

(C) **Percutaneous low frequency stimulations of stiff shoulder and stiff neck (50 cases)** - all the electrodermal points (=Nakatani's Ryodoten) concerned to stiff shoulder and stiff neck were investigated at the nearest sides of the original Chinese acupuncture point. They were ① TENCHU, ② FUCHI, ③ KENSEI, ④ KENCHU YU, ⑤ KENGAI YU, ⑥ TENRYO, ⑦ TENSO, ⑧ KOKO, ⑨ KYOKUCHI, ⑩ TE NO SANRI, and ⑪ GOKOKU.

The ring blotting papers soaked in 5% salt solution were placed on each electrodermal point (=Nakatani's Ryodoten), and then followed by placing the SSP electrodes (anodes & cathodes) on these ring areas by adhesive tapes for fixation. The procedure for the connections of low frequency stimulator cord were the same as described ⑧. The time for stimulations was 30 minutes. The next stimulations were performed for every 4 days until the electrodermal point's electricity climbed down or decreased.

(D) **Electricity of electrodermal points** (=Nakatani's Ryodoten) - the initial

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electricity of electrodermal points were recorded as the same procedure as described ⑧, and the mean electrodermal point's electricity was also calculated after each time of stimulation.

Results

The mean electricity of electrodermal point before stimulation was $166 \pm 6 \mu A$, and the mean electricity of electrodermal point after 20 time stimulations showed $106 \pm 4 \mu A$. At this level, 39 patients showed no sign of stiff shoulder and stiff neck. The other 11 patients gave moderate satisfactory results. It was because these 11 patients had some complications such as (1) hepatitis (1 patient), (2) nephritis (2 patients), (3) gastric ulcers (2 patients), (4) gall stones (1 patient), (5) allergic rhinitis (2 patients), (6) decayed teeth (1 patient), and (7) the cervical cervix deformity (1 patient). The electrodermal points (=Nakatani's Ryodoten) concerned to the stiff shoulder and stiff neck were described in the legends of figure (1) A [neck points] & B [upper shoulder points] and the figure (2) C [middle shoulder points] & D [lower shoulder points].

Conclusion

Possible control of stiff shoulder and stiff neck could be observed among 39 patients in out of 50. The other 11 patients did not give satisfactory results due to some complications. Silver spike point electrodes (Hyodo) together with **ring blotting papers** soaked in 5% salt solution were so useful for performing the percutaneous low frequency stimulations at electrodermal points (=Nakatani's Ryodoten) concerned to the stiff shoulder and stiff neck.

肩こりと頸部のこりに関連のある良導点への 経皮的低周波刺激について

〔良導点における電流量の観察〕

〔前書き〕：肩と頸部のこりは肩筋肉（僧帽筋（上・中・下）、小菱形筋、大菱形筋、肩甲挙筋、棘上筋、棘下筋、小円筋、大円筋他）と頸部筋肉（頭最長筋、頸最長筋、胸最長筋、頭半棘筋、頸半棘筋、胸半棘筋、頭棘筋、頸棘筋、胸棘筋他）の緊張又は伸張から起る。

寺村氏①によれば肩や頸部のこりの原因は(1)筋膜性、(2)筋肉の疲労と緊張、(3)老化現象、(4)変形性頸椎症、(5)いわゆる五十肩、(6)頸腕症候群、(7)頸部の腫瘍、(8)むちうち損傷と(9)内臓（例えば(a)肺臓、(b)肝臓、(c)心臓、(d)胆石、(e)胃潰瘍、(f)脾臓、(g)高血圧、(h)低血圧、(i)眼、

(j)鼻、(k)歯他）などの障害によるとのことである。

鈴木氏②は古典的 鍼 療 法 を、近藤氏、中川氏、白井氏らは電気鍼療法を肩と頸部のこりの治療に採用した。(③、④、⑤)

また投薬療法として(1)ビタミン(B₁、B₆、B₁₂、C)、(2)抗筋緊張剤(クラレ、サシナルコリン)、(3)交感神経ブロック剤(スコパミン、パパタリン)、(4)鎮痛剤(アミノピリン、フィナセチン又プロカイン等)と(5)漢方薬(葛根湯)を用いる。しかしながら鍼治療、薬剤注射、飲み薬や漢方薬などを好まない患者が

Fig.1

Fig.2

多く、これら以外の方法を望むことが多い。そこで経皮低周波刺激は十分に効果が期待でき、費用もかからないので長期にわたる治療ができる。

〔材料と方法〕：(A) 器具及び手順—研究論文(⑧、⑨)で述べたものと同じで、SSP電極を使う⑩。低周波のサイクルと電圧調節は1 Hz/75 μ V この場合は経皮低周波刺激を4 Hz/300 μ Vで最後まで用いる。しかし、SSP電極は繰り返し刺激を与えると接触性皮膚炎や刺激性皮膚炎を起こすことがある。これらの皮膚損傷をさけるため電気の伝導性をよくするのに、5%の食塩水につけた輪状の湿性紙を用いた。

(B) 良導点の探索—研究論文(⑧、⑨)で述べたものと同じ。

(C) 肩こりと頸部のこりへの経皮低周波刺激治療(50例)—肩こりと頸部こりに関連のある良導点は経穴名でいうと①天柱、②風池、③肩井、④肩中俞、⑤肩外俞、⑥天髎、⑦天宗、⑧膏肓、⑨曲池、⑩手の三里と⑪合谷。

輪状湿性紙を各々の良導点上に置き、さらにSSP電極(陽極、陰極)をセットと粘着テープで固定する。これら低周波刺激のコードの連結法は研究論文⑧で述べた。刺激の所用時間は30分で、その後4日置きに良導点の電量値が下るまで続けた。

(D) 良導点での電流—良導点の電量値を記録する方法は研究論文⑧で述べた。

〔結果〕：刺激前の良導点の平均電流値は166 $\pm$ 6 μ Aで20回の刺激の後のそれは106 $\pm$ 4 μ Aであった。この段階で39名の患者のこり症状がとれ、残り11名の患者には改善が見られなかった。

これらの患者は(1)肝炎(1名)、(2)腎炎(2名)、(3)胃潰瘍(2名)、(4)胆石(1名)、(5)アレルギー性鼻炎(2名)、(6)虫歯(1名)と(7)変形性頸椎症(1名)、などの合併症がみられた。

〔結論〕：肩こりや頸部こりの50名の患者のうち39名が改善された。残り11名は合併症のため満足な結果が得られなかった。SSP電極と輪状湿性紙は非常に有用であった。

図(1)と(2)の説明：

図(1)〔A〕は、46才の女性で、5%食塩水につけた輪状湿性紙を治療点(①頸部=天柱、風池、②上肩部=肩井、③下肩部=膏肓他)に置いた。〔B〕は経皮低周波刺激のためSSP電極を粘着テープで固定した後4 Hz/300 μ Vで30分間刺激。この例では肩と頸部の瘀血状態を観察するため赤外線カラーフィルムで撮ったもので、瘀血証があるところは白く写っている。

図(2)〔C〕は56才の男性で、〔D〕は〔B〕と同じ刺激を加えた。この患者は肝炎の合併症があるため瘀血状態の変化は見られず。

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Legends of figure (1) to figure (2)

Fig. (1) [A] showed the placing of 5% salt soaked **ring blotting papers** on the area of electrodermal points (=Nakatani's Ryodoten) concerned to stiff shoulder and stiff neck [neck points=TENCHU, FUCHI, upper shoulder point=KENSEI, lower shoulder point=KOKO], and it was a typical case of 46 year old female. [B] showed the percutaneous low frequency stimulations after placing SSP (Hyodo) with adhesive tapes on each electrodermal point (=Nakatani's Ryodoten) by using 4 Hz/300 μ V for 30 minutes, and it was a similar case of [A]. Color-infrared (with filter) of [A] showed poor blood circulation at M. trapezius, M. scapulae and M. rhomboideus as **white area**, and [B] again showed the **dimished white area** after 30 minutes of low frequency stimulation; the result of good circulation appeared on this area. Fig. (2) [C] showed the sticking of adhesive tapes together with SSP (Hyodo) and 5 % salt solution soaked ring blotting papers on each electrodermal point (=Nakatani's Ryodoten) concerned to the stiff shoulder and stiff neck, and it was a typical case of 65 year old female. [D] showed the percutaneous low frequency stimulations through the SSP electrodes (anodes & cathodes) by using 4 Hz/300 μ V for 30 minutes, and it was a similar case of [C]. These were also taken by color-infrared photography (with filter) before and after SSP low frequency stimulations. The **white area** (poor circulation) showed no change at all, because this patient had a complication of alcoholic hepatitis (GOT=150 U, GPT=260 U & r-GTP=400 U).