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# The Efficacy of Healthy Stand on Back Pain in Office Syndrome

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**ABSTRACT**

A healthy stand is local wisdom's innovation to stretch the working tension on muscles and tendons. The carpenter made it by local material as a vertical wood plate with an angle of 50 degrees to release the pressure on the body's dorsal muscle. The researchers studied the effect of the healthy stand on back pain, one of the common symptoms in office syndrome comparing to the individual. This study was the Quasi-Experimental design on a one-group pretest-posttest design. The population was the staff working in Samut Songkram Education Center, Suan Sunandha Rajabhat University, to support a team. The sample was sampling by purposive sampling from the staff with back pain and evaluated at least mild pain by Visual Analog Scales (VAS). We conducted 30 staff by using a questionnaire of pain and sampling methods. The test was performed on the healthy stand with two positions; each trial was 2 minutes, once a day, for five days. The pain was recorded before and post-test. We used a computing program analyzed data. The result proved the healthy stand significantly reduced back pain in office syndromes with a confidence of 0.05. The individual information has no impact on the effect of back pain reduction.

Keywords: Healthy stand, back pain, office syndrome

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## INTRODUCTION

Office syndrome is increasing in office staff from 55% to 60% in 2016 and 2017. In Europe, the common medical consultation of office syndromes was back pain, followed by neck and shoulder pain and headache. It was found in all age group but mostly in the people who spend long working hours in front of the monitor with improper position that affect to their daily work and life (Reanaree et al., 2016; Suksatan & Ounprasertsuk, 2020).

Mr. Sawang Boonchaidej, 79-year-old retired officer, invented this healthy stand not for medical purpose, but for health promotion. It is well-known in stretching muscle and tendon strain. Not only in working tension by also in paralyzed muscle. Muscle spasm and joint stiffness caused pain and needs releasing prior to complicated with chronic pain (Tanaka et al., 2018). The stretching of the ankle stretches the dorsal muscles on leg and back and release pain as in Thai traditional medicine wisdom (Khotaphan & Charucharana, 2017). However, no scientific research on the efficacy of this healthy stand.

Medical and public health secretary, as other secretaries, works with the document and computer. The risk of office syndromes related pain is high including back pain, neck and shoulder pain and headache (Hakala et al., 2006). We need to prove if the healthy stand can release the symptoms or not.

Office syndrome is the symptoms found in the office staff who spend long working hours on the seat with computer, using the same position and muscles without moving (Mowatt et al., 2018). The muscle pain may focus on the shoulder or spread to the whole body. In severe case with chronic pain, medical consultation may be needed. The most common cause of office syndromes is the position of the table, seat, keyboard and monitor (Noreen et al., 2021). Ventilation and light also affected to the symptoms. Individual working habit and physical status also the causes (Suksatan, 2018). It may call computer syndrome or iPad syndrome.

Operators lacking ergonomics factor There will be two times more likely to have skeletal abnormalities than normal (Jaiban et al., 2013). However, most organizations today are not taking this seriously. This is because computer syndrome is a slow symptom but can have long-term effects on the sick (Mowatt et al., 2018). Which currently has a greater proportion. This can be observed from the presence of physical therapy establishments and the expansion of traditional massage businesses as Number of users (Suksatan, 2019; Thongchim, 2013).

Low back pain and myofascial pain is common (Urits et al., 2019). Back muscle in prolong unusual position may pain, complicated with chronic pain (Liu et al., 2018). New normal working style may increase the risk of pain. The pain found up to 60% of office staff without exercise and worked in limited space. It can be easily solved by repositioning and respacing of the workplace and can be treated by exercise and rehabilitation (Office of Risk Communication and Response, 2015). The symptoms may release up to 40% in 2 weeks and over 90% of case may improve in 3 months. 5-10% may turn to chronic pain and needs medication (Buranababab, 2009).

## OBJECTIVE

1. To study the efficacy of healthy stand on back pain in office syndrome.
2. To compare the effect of the healthy stand on individual.

## METHODS

This is the Quasi - Experimental design on one-group pretest-posttest design. The population was the staff in Samut Songkram Education Center, Suan Sunandha Rajabhat University in both education and supporting team. The sample was sampling by purposive sampling from the staff with back pain and evaluated at least mild pain by Visual Analog Scales (VAS). Visual rating scales using a straight line, 10 cm long, divided into 10 spaces, 1 cm each. The numbers represent the degree of pain, with one end representing the value with 0 meaning no pain, the other side representing the value of 10 means pain is most severe, which number of patients is marked as pain score (Tanban et al., 2020). The research was performed in January to December 2019. The sample of 30 staff were collected by questionnaire of pain and sampling methods. The criteria included at least a year working in this

institute with once or twice a week pain and willing to enroll the research. We exclude the pregnant and diagnosed or suspected musculoskeletal disorder.

Healthy stand has 2 wood plates 11.8 x 9 x 1 inch fixed together in 45 degree. It would bare up to 120 kilograms. The test was performed on the healthy stand with two positions. Each test was 2 minutes, once a day for 5 days. Pain was recorded prior and post-test. Data was analyzed by computing program. The first position is stand still on the healthy stand with 10 breaths count then move the arm front and back for 50-100 times as figure 2. The second position is turning to the right and left for 10 times with the hands look like holding a ball as in figure 3.

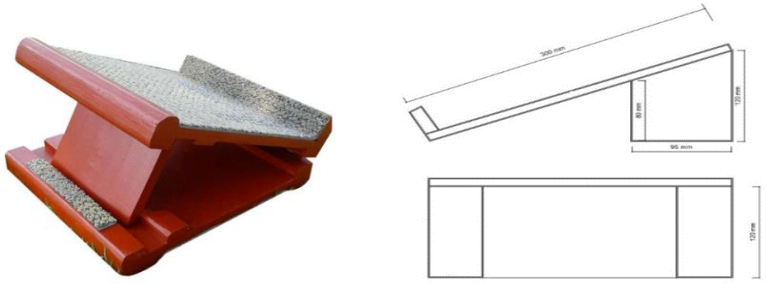

Fig. 1 Healthy stand

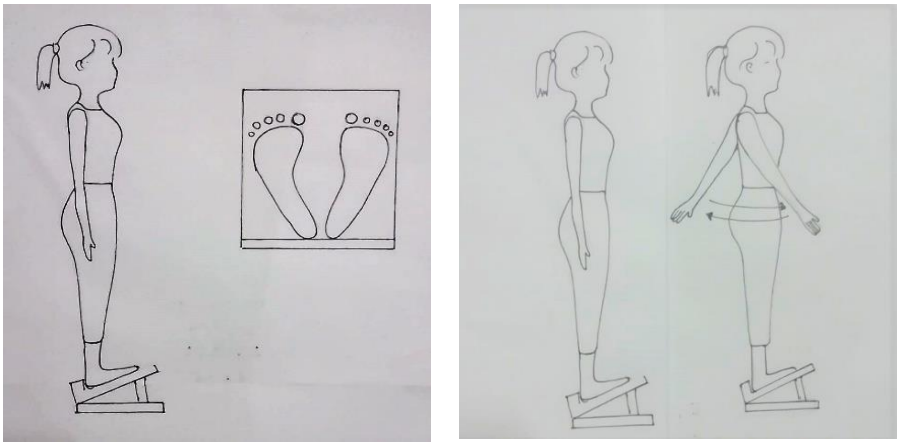

Fig. 2 Standing and the first position

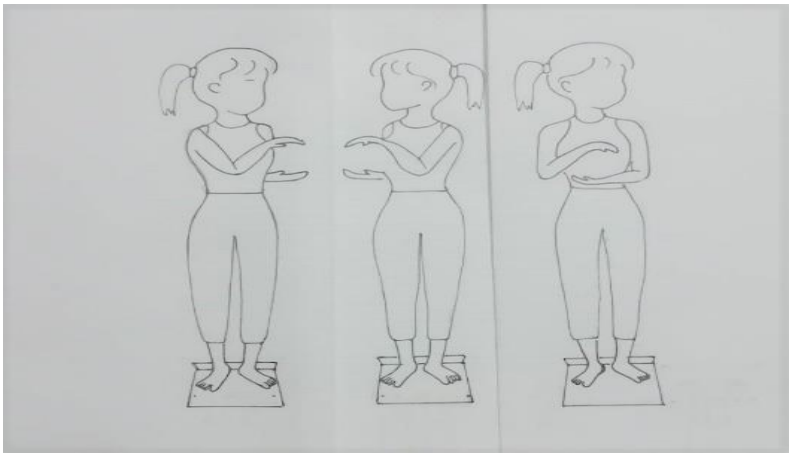

Fig. 3 The second position

Data were collected and pain was evaluated Visual Analog Scales (VAS) according to Pain Assessment and Measurement (Paiboonworachat, 2017) on the validated questionnaire. Pre and post-test were recorded and analyzed by computing program.

## RESULTS

**Part 1 Demographic data**

The sample of 30 staff, 86.7% were female with age group of 20-40 covered 83.3%. 66.7% has 150-160 cm. height and 63.3% weight 41-60 kgs. Half of them has normal BMI as 18-25 kg/m$^2$.

Timing of pain onset were nearly the same in 3 groups as less than 3 months, 3-6 month and over 6 months. Mostly

had severe pain score 7-10 as 60%, the rest except one had moderate pain score 4-6 and the only one had mild pain score 1-3. The frequency of pain in the group less than twice a week and over twice a week were nearly equal. The duration of pain over 5 minutes was the majority of 70% and the rest 30% had pain less than 5 min in each attack. The detail showed in Table 1.

**Table 1.** Patient Demographics (*N*=30)

| Demographic data | Number | Percentage |
|---|---|---|
| **Gender** | | |
| Male | 4 | 13.3 |
| Female | 26 | 86.7 |
| **Age (year)** | | |
| 20 - 30 | 10 | 33.3 |
| 31 - 40 | 15 | 50.0 |
| 41 and over | 5 | 16.7 |
| Mean=34.27, *S.D.*=9.55, max=62, min=23 | | |
| **Height (cm)** | | |
| < 150 | 2 | 6.7 |
| 151 - 160 | 20 | 66.7 |
| 161 - 170 | 5 | 16.7 |
| 171 – 180 | 2 | 6.7 |
| > 180 | 1 | 3.3 |
| Mean=159.40, *S.D.*=9.55, max=187, min=145 | | |
| **Weight (kgs)** | | |
| 41 - 60 | 19 | 63.3 |
| 61 - 80 | 7 | 23.3 |
| 81 - 100 | 2 | 6.7 |
| > 100 | 2 | 6.7 |
| Mean = 62.03, *S.D.*=18.85, max=120, min=43 | | |
| **Body Mass Index (kg/m2)** | | |
| < 18.5 | 2 | 6.7 |
| 18.5 – 22.9 | 8 | 26.7 |
| 23.0 – 24.9 | 8 | 26.7 |
| 25.0 – 29.9 | 7 | 23.3 |
| > 29.9 | 5 | 16.7 |
| Mean=24.55, *S.D.*=18.85, max=38, min=17 | | |
| **Timing of pain onset** | | |
| Less than 3 months | 9 | 30.0 |
| 3 - 6 months | 11 | 36.7 |
| 6 months and over | 10 | 33.3 |
| **Severity of pain by VAS** | | |
| 0 (no pain) | 0 | 0 |
| 1 – 3 (mild pain) | 1 | 3.3 |
| 4 – 6 (moderate pain) | 11 | 36.7 |
| 7 – 10 (severe pain) | 18 | 60.0 |
| Mean=6.83, *S.D.*=1.76, max=10, min=2 | | |
| **Frequency of pain per week** | | |
| 1-2 times per week | 16 | 53.3 |
| over 2 times per week | 14 | 46.7 |
| **Duration of each attack (min)** | | |
| Less than 5 min | 9 | 30.0 |
| 5 minute and over | 21 | 70.0 |
| Total | 30 | 100 |

**Part 2 Data analysis comparing the efficacy of healthy stand, pre and post-test.**

The average pain score in each of 5 tests showed decreasing gradually as VAS in the first test was $\bar{X}$ = 6.80, *S.D.* = 1.808. The following tests were $\bar{X}$ = 6.27, *S.D.* = 1.837 in the second, $\bar{X}$ = 5.30, *S.D.* = 1.418 on the third, $\bar{X}$ = 4.23, *S.D.* = 1.478 on the fourth and the last test $\bar{X}$ = 3.30, *S.D.* = 1.368 as in Table 2.

**Table 2.** Pre-test pain score (*N*=30)

| Test | Pain score by VAS | | |
|---|---|---|---|
| | **Mean** | ***S.D.*** | **Std. Error Mean** |
| 1 | 6.80 | 1.808 | .330 |
| 2 | 6.27 | 1.837 | .335 |
| 3 | 5.30 | 1.418 | .259 |
| 4 | 4.23 | 1.478 | .270 |
| 5 | 3.30 | 1.368 | .250 |


Figure 4 Pre-test pain score by VAS

The average post-test pain score by VAS also gradually decreased as $\bar{X}$ = 6.33, *S.D.* = 1.882 on the first test, $\bar{X}$ = 5.50, *S.D.* = 1.635 on the second test, $\bar{X}$ = 4.07, *S.D.* = 1.311 on the third test, $\bar{X}$ = 2.53, *S.D.* = 1.137 on the fourth test and $\bar{X}$ = 1.34, *S.D.* = 1.073 on the last test respectively as showed in Table 3.

**Table 3.** Post-test pain score (*N*=30)

| Test | Pain score by VAS | | |
|---|---|---|---|
| | **Mean** | ***S.D.*** | **Std. Error Mean** |
| 1 | 6.33 | 1.882 | .344 |
| 2 | 5.50 | 1.635 | .298 |
| 3 | 4.07 | 1.311 | .239 |
| 4 | 2.53 | 1.137 | .208 |
| 5 | 1.34 | 1.073 | .196 |

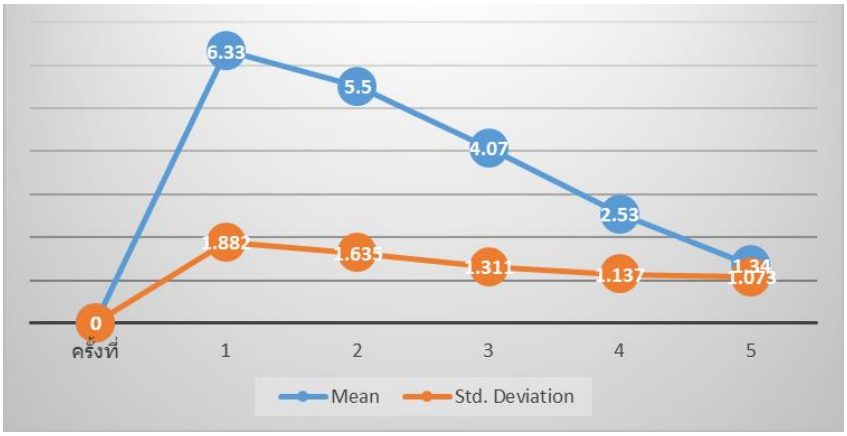


Figure 5. Post-test pain score by VAS

**Table 4.** Pre and post-test pain score (*N*=30)

| Test | Pre / Post | Pain score by VAS | | |
|---|---|---|---|---|
| | | **Mean** | ***S.D.*** | **Std.Error Mean** |
| 1 | Pre | 6.80 | 1.808 | .330 |
| | Post | 6.33 | 1.882 | .344 |
| 2 | Pre | 6.27 | 1.837 | .335 |
| | Post | 5.50 | 1.635 | .298 |
| 3 | Pre | 5.30 | 1.418 | .259 |
| | Post | 4.07 | 1.311 | .239 |
| 4 | Pre | 4.23 | 1.478 | .270 |
| | Post | 2.53 | 1.137 | .208 |
| 5 | Pre | 3.30 | 1.368 | .250 |
| | Post | 1.34 | 1.073 | .196 |

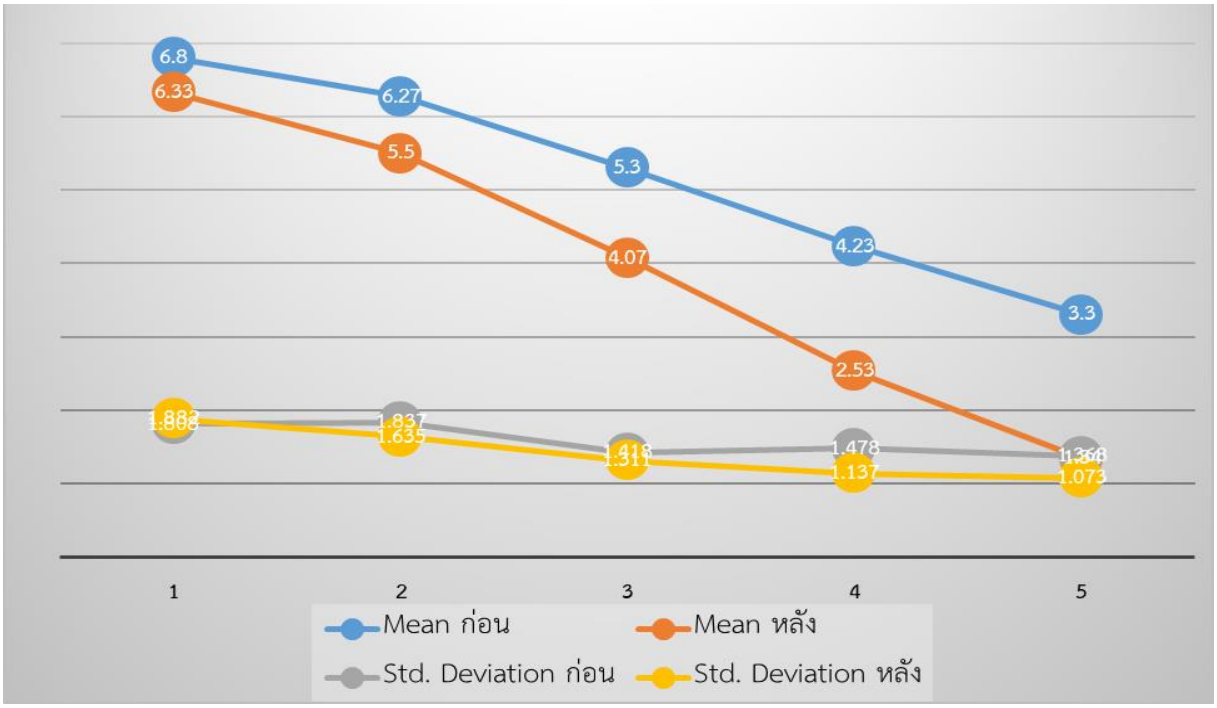


Figure 6. Pre and post-test pain score by VAS

Comparing pre and post-test pain score by Paired t – test. They were statistically significant decreasing as score .467, .767, 1.233, 1.700 and 1.867 respectively as showed in Table 5.

**Table 5.** Comparing pre and post-test pain score by Paired *t* – test (*N*=30)

| Test | $\bar{X}$ | *S.D.* | *T* - value | *P* - value |
|---|---|---|---|---|
| 1 | .467 | .860 | 2.971 | .006 |
| 2 | .767 | .817 | 5.139 | .000* |
| 3 | 1.233 | .626 | 10.790 | .000* |
| 4 | 1.700 | .794 | 11.721 | .000* |
| 5 | 1.867 | .937 | 10.910 | .000* |

Part 3 Individual factors related to pain.
*T*–test for independent sample was used for one group and ANOVA for 2 groups and over. In case of positive result, paired by Scheffe will be used. We found that sex, age, height, weight and BMI had no statistically significant effect to pain score.

**Table 6.** Comparing of pain by gender (*N*=30)

| Sex | | n | $\bar{X}$ | *S.D.* | *T* - value | *P* - value |
|---|---|---|---|---|---|---|
| **Before** | Male | 4 | 7.50 | 1.732 | 0.827 | 0.415 |
| | Female | 26 | 6.69 | 1.828 | | |
| **After** | Male | 4 | 1.50 | 1.291 | 0.313 | 0.768 |
| | Female | 26 | 1.42 | 1.065 | | |

**Table 7.** Comparing of pain by age (*N*=30)

| | Variation | SS | DF | MS | *F* | *P* - value |
|---|---|---|---|---|---|---|
| **Before** | External | 1.500 | 2 | .750 | .217 | 0.806 |
| | Internal | 93.300 | 27 | 3.456 | | |
| | Total | 94.800 | 29 | | | |
| **After** | External | .033 | 2 | .017 | .013 | 0.987 |
| | Internal | 33.333 | 27 | 1.235 | | |
| | Total | 33.367 | 29 | | | |

**Table 8.** Comparing of pain by height (*N*=30)

| | Variation | SS | DF | MS | *F* | *P* - value |
|---|---|---|---|---|---|---|
| **Before** | External | 10.150 | 4 | 2.538 | .749 | 0.568 |
| | Internal | 84.650 | 25 | 3.386 | | |
| | Total | 94.800 | 29 | | | |
| **After** | External | 1.217 | 4 | .304 | .237. | 0.915 |
| | Internal | 32.150 | 25 | 1.286 | | |
| | Total | 33.367 | 29 | | | |

**Table 9.** Comparing of pain by weight (*N*=30)

| | Variation | SS | DF | MS | *F* | *P* - value |
|---|---|---|---|---|---|---|
| **Before** | External | 12.616 | 3 | 4.205 | 1.330 | .286 |
| | Internal | 82.184 | 26 | 3.161 | | |
| | Total | 94.800 | 29 | | | |
| **After** | External | 4.701 | 3 | 1.567 | 1.421 | .259 |
| | Internal | 28.665 | 26 | 1.103 | | |
| | Total | 33.367 | 29 | | | |

**Table 10.** Comparing of pain by BMI (*N*=30)

| | Variation | SS | DF | MS | *F* | *P* - value |
|---|---|---|---|---|---|---|
| **Before** | External | 7.634 | 4 | 1.909 | .530 | .715 |
| | Internal | 86.504 | 24 | 3.604 | | |
| | Total | 94.138 | 28 | | | |
| **After** | External | 6.084 | 4 | 1.521 | 1.451 | .248 |
| | Internal | 25.157 | 24 | 1.048 | | |
| | Total | 31.241 | 28 | | | |

## DISCUSSION

The Quasi - Experimental design for evaluate the efficacy of the healthy stand for back pain in office syndrome by one-group pretest-posttest design. The population were the staff in Samut Songkram Education Center, sampling by purposive sampling from positive back pain with mild VAS and above. The sample of 30 staff were recorded pre and post-test pain score. The intervention was standing on the healthy stand, the Thai local wisdom tool, with 2 positions. The questionnaire was validated with IOC, Index

of item Objective Congruence over 0.05. The tests were performed one a day for 5 consecutive days, each 2 minutes. Data was recorded before and after each test.

Most of the sample were female, age 20-40 years, 151-160 cm. height, weight 40-60 kgs and BMI of 18-25 kg/m$^2$. The onset of pain onset was nearly the same in 3 groups as less than 3 months, 3-6 month and over 6 months. Mostly had severe pain score 7-10 as 60%, the rest except one had moderate pain score 4-6 and the only one had mild pain score 1-3. The frequency of pain in the group less than twice a week and over twice a week were nearly equal. The duration of pain over 5 minutes was the majority of 70% and the rest 30% had pain less than 5 min in each attack.

The average pre-test pain scores were decreasing gradually as $\bar{X}$ = 6.80, *S.D.* = 1.808. in the first test, followed by $\bar{X}$ = 6.27, *S.D.* = 1.837 on the second, $\bar{X}$ = 5.30, *S.D.* = 1.418 on the third, $\bar{X}$ = 4.23, *S.D.* = 1.478 on the fourth and $\bar{X}$ = 3.30, *S.D.* = 1.368 on the last test respectively. As same as the average post-test scores showed gradually decrease as $\bar{X}$ = 6.33, *S.D.* = 1.882, $\bar{X}$ = 5.50, *S.D.* = 1.635, $\bar{X}$ = 4.07, *S.D.* = 1.311, $\bar{X}$ = 2.53, *S.D.* = 1.137 and $\bar{X}$ = 1.34, *S.D.* = 1.073 on the last test respectively.

Comparing pre and post-test pain score by Paired *t* – test. They were statistically significant decreasing of VAS as .467, .767, 1.233, 1.700 and 1.867 respectively. These means the healthy stand is effective to decrease pain score of back pain in office syndrome. It is correlated to the other studies concerning muscle stretching to reduce back pain and office syndrome. The study was running to our objective in the efficacy of healthy stand on back pain in office syndrome. Even though it showed the trend of improving, the limitation of the research on 5 tests may not enough for final conclusion.

The innovation of local wisdom showed the efficacy to reduce pain score with low budget of few hundred Thai baht. It is suitable for developing country to apply for their people who suffered by office syndrome. Medical cost and side effect of NSAID medication remain the issue of poor people. One healthy stand can be used for the whole staff in each office with highest cost-effectiveness.

## RECOMMENDATION

Healthy stand is an effective innovation to reduce suffering pain of office syndrome. It is easy and convenience for the staff with symptoms. Medication can be reduced and replaced with this tool. However, further study with larger sample size should be considered. Proper timing and standing position for better outcome should be study including long term effect and complication of the tool.

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## CONFLICT OF INTEREST

The authors declare no conflicts of interest.

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