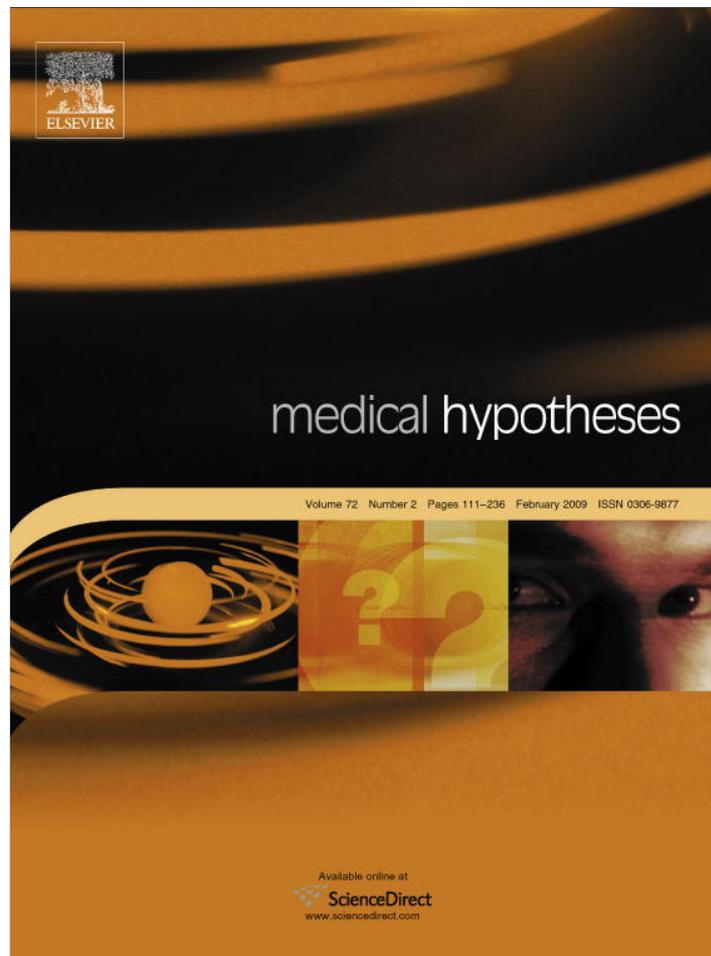


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## Medical Hypotheses

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### Correspondence

## Pelvic floor muscle exercises may improve female sexual function

The pelvic floor muscles attach from the pubic bone anteriorly, to the coccyx posteriorly and form a bowl-like structure, along with ligaments and fascial tissue. The main functions of the pelvic floor are to provide support of the pelvic organs and prevent incontinence by promoting voluntary closure of the urethral and anal sphincters. Adequate pelvic floor muscle function is a necessary component of bowel and bladder control [1]. Recent studies indicate that the pelvic floor of the female have some impact on sexual function, which involved in arousal and orgasm.

Dr. Arnold Kegel had identified pelvic floor muscle weakness in women as a source of sexual dysfunction in 1952. From then on, pelvic floor hypotonus has been purported to impact negatively on sexual activity. The strong pelvic floor muscles in women, particularly the ischiocavernosus muscle that attaches to the clitoral hood, were crucial for adequate genital arousal and attainment of orgasm [2]; however, the weak or de-conditioned muscles may provide insufficient activity necessary for vaginal friction or blood flow, and inhibit orgasmic potential [3]. At a more speculative, theoretical level, the idea that chronic muscle blocks (or excessive muscle flaccidity) impair sexual function by impairing feeling, sexual motility (and perhaps being a tangible representation of corresponding psychological blocks), and the discharge of sexual tension has its roots [4]. Therefore, female sexual pleasure is enhanced for both partners by genital responses provided by contraction of the levator ani, consisting of the pubococcygeus and iliococcygeus muscles during sexual activity [5].

It is reasonable to hypothesize that pelvic floor muscle strengthening should improve female sexual function and the pelvic floor muscle exercise is essential to the treatment of female sexual dysfunctions. In view of the above hypothesis, we can perform the following exercises program. (i) Increase awareness and proprioception of the musculature of the pelvic floor,

(ii) improve muscle discrimination and muscle relaxation, (iii) normalize muscle tone, so that to increase elasticity at the vaginal opening.

### Acknowledgements

This work was financially supported by the Grants from Shanghai Science and Technology Development Fund (No. 05DJ14010), the Major Basic Research Program of Shanghai (No. 07DZ19505), and the Ministry of Science and Technology of People's Republic of China (No. 2008CB517403).

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doi:10.1016/j.mehy.2008.09.026

## Choir singing and fibrinogen. VEGF, cholecystokinin and motilin in IBS patients

Several studies have shown beneficial psychological and/or biological effects of singing in a choir [1,3,4,7]. Our own group [5] has shown that the singing lesson is associated with increased relaxation and energy and an elevated oxytocin concentration.

FMRI studies have indicated that singing is a more powerful stimulus than speech to certain brain regions that are of particular

importance to emotional regulation [2]. It could be that this augmented activation by singing may also strengthen beneficial psychoneuroendocrine reactions.

May be choir singing is beneficial for stress related disorders in general? IBS is a common gastrointestinal disorder that is influenced by psychological factors and stress. Talking to patients with

**Table 1**  
Symptom score means in the two groups before start and one year later

	Before	One year later
<b>Pain</b>		
Choir <i>n</i> = 11	7.18 ± 0.77	6.46 ± 0.90
Study <i>n</i> = 14	6.29 ± 0.59	6.93 ± 0.62
	Mann Whitney <i>U</i> -test for difference between baseline and one year later: <i>z</i> = -1.73, <i>p</i> = 0.08	
<b>Satiety</b>		
Choir <i>n</i> = 11	7.18 ± 0.84	8.36 ± 0.93
Study <i>n</i> = 14	8.50 ± 1.23	7.36 ± 0.91
	Mann Whitney <i>U</i> -test for difference between baseline and one year later: <i>z</i> = -1.41, <i>p</i> = 0.16	
<b>Bloating</b>		
Choir <i>n</i> = 11	9.18 ± 0.78	8.18 ± 0.72
Study <i>n</i> = 14	7.29 ± 0.68	6.86 ± 0.73
	Mann Whitney <i>U</i> -test for difference between baseline and one year later: <i>z</i> = -0.50, <i>p</i> = 0.62	
<b>Diarrhea</b>		
Choir <i>n</i> = 11	8.82 ± 1.03	10.27 ± 1.24
Study <i>n</i> = 14	9.64 ± 1.00	9.57 ± 1.17
	Mann Whitney <i>U</i> -test for difference between baseline and one year later: <i>z</i> = -0.94, <i>p</i> = 0.35	
<b>Constipation</b>		
Choir <i>n</i> = 11	8.82 ± 1.36	8.64 ± 1.52
Study <i>n</i> = 14	7.57 ± 1.11	6.93 ± 1.02
	Mann Whitney <i>U</i> -test for difference between baseline and one year later: <i>z</i> = -0.25, <i>p</i> = 0.80	

Standard errors of means.

a similar condition – Non Ulcer Dyspepsia – [6] about difficult matters has been shown to influence IBS-relevant hormones such as cholecystokinin and motilin. Group information including group talk has been shown to be of benefit compared to the distribution of written “passive” IBS information [8]. A regularly occurring experience with choir singing might accordingly stimulate psychophysiological processes that could benefit the IBS patient (see Tables 1 and 2).

In order to explore this hypothesis we performed a small-scale RCT on IBS patients.

IBS patients were recruited who had declared interest in being randomised to either choir singing (*n* = 28) or study (*n* = 27) group. Interventions took place once a week for a year. Approximately half of the patients in both groups (11–14 subjects in each group) finished their intervention programmes and provided blood samples and self-report data before start and after one year. Blood samples were analysed with regard to factors involved in the regulation of gastrointestinal and immunological functions. Due to skewed distributions all hormone concentrations were transformed (natural logarithms) in statistical computations.

After one year the development of gastrointestinal pain tended (difference in scores, Mann Whitney *U*-test for differences, *p* = 0.08) to have been better in the choir group. The motilin concentration tended to decrease in the choir group and increase in the other group (ANOVA interaction *p* = 0.08). The fibrinogen concentration increased in the information group but not in the choir group (ANOVA interaction *p* = 0.047). Both fibrinogen and VEGF (vascular endothelial growth factor) increased significantly in both groups. There were no significant findings for cholecystokinin.

Our findings motivate studies examining the choir singing hypothesis in relation to stress-related conditions.

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**Table 2**  
Biological parameters – means and standard errors of means (SEM) of natural logarithms of the concentration in each group before and after the study year

	Mean ± SEM before	Mean ± SEM after
<b>Motilin (nlog pmol/l)</b>		
Choir <i>n</i> = 11	4.18 ± 0.13	4.10 ± 0.13
Study <i>n</i> = 11	3.99 ± 0.17	4.06 ± 0.11
	<i>F</i> group = 0.37, <i>p</i> = 0.55	
	<i>F</i> time = 0.02, <i>p</i> = 0.90	
	<i>F</i> interaction = 3.41, <i>p</i> = 0.080	
<b>Cholecystokinin CCK (nlog pmol/l)</b>		
Choir <i>n</i> = 11	-0.43 ± 0.17	-0.45 ± 0.11
Study <i>n</i> = 11	-0.61 ± 0.15	-0.45 ± 0.12
	<i>F</i> group = 0.19, <i>p</i> = 0.67	
	<i>F</i> time = 0.47, <i>p</i> = 0.50	
	<i>F</i> interaction = 0.99, <i>p</i> = 0.33	
<b>Vascular endothelial growth factor VEGF (nlog pg/ml)</b>		
Choir <i>n</i> = 13	4.05 ± 0.13	4.91 ± 0.22
Study <i>n</i> = 14	3.85 ± 0.13	4.59 ± 0.20
	<i>F</i> group = 1.33, <i>p</i> = 0.26	
	<i>F</i> time = 59.00, <i>p</i> = 0.0001	
	<i>F</i> interaction = 0.33, <i>p</i> = 0.57	
<b>Fibrinogen (nlog g/l)</b>		
Choir <i>n</i> = 13	1.15 ± 0.07	1.21 ± 0.06
Study <i>n</i> = 13	1.07 ± 0.05	1.28 ± 0.07
	<i>F</i> group = 0.001, <i>p</i> = 0.97	
	<i>F</i> time = 14.78, <i>p</i> = 0.001	
	<i>F</i> interaction = 4.39, <i>p</i> = 0.047	
<b>C reactive phase protein CRP (nlog mg/l)</b>		
Choir <i>n</i> = 13	0.48 ± 0.26	0.34 ± 0.29
Study <i>n</i> = 13	0.51 ± 0.38	0.17 ± 0.36
	<i>F</i> group = 0.03, <i>p</i> = 0.86	
	<i>F</i> time = 1.35, <i>p</i> = 0.26	
	<i>F</i> interaction = 0.24, <i>p</i> = 0.63	

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doi:10.1016/j.mehy.2008.09.019

## Is there a role of melatonin in the development of growing pains?

Growing pain (GP) is a type of non-inflammatory pain syndrome, which particularly affects children between the ages of 3 and 12 years [1,2]. The child complains of lower limb pain usually appears at night often awaking him. By morning, the child is almost always pain free. The pathogenesis of GP is not exactly known and the question why GP occurs at night could not be answered clearly. Melatonin and GP are linked in several ways. The author would like to hypothesize that increases in nocturnal melatonin secretion may contribute to development of GP.

The melatonin is the major hormone responsible for the maintenance of circadian rhythm and is secreted in nighttime. The melatonin concentrations peak at ages 2–5 years and undergo a continuing decline that starts with puberty [3–6]. Indeed, GP occurs mostly among children aged between 2 and 5 years and disappear by the ages conforming to puberty [1,2].

Previous studies suggested that exercise increases melatonin secretion in adults [7]. Besides, Pérez Navero et al. showed that melatonin level was increased after competitive physical activity in children [8]. Accordingly, children especially have GP on days of increased physical activity [1,2].

Melatonin secretion is suppressed by light [9]. The suppression of melatonin secretion after light exposure was shown to be significantly much less in brown-eyed children than in light-eyed children [10]. In a series published by Hawksley, dark and brown-eyed children with dark hair were observed to be much more likely to develop GP than blue-eyed children with blonde or light-colored hair [11].

Most of the children with GP do not require a specific treatment. Comforting and local massage often help to resolve the pain. The author suggests that awakening of the child and putting on lights by parents to see what is happening to the child are activities that actually reduce pain by decreasing melatonin level.

Further studies into the pathogenesis of GP are required to determine whether the nocturnal melatonin increase has a clinical implication. If so, timing of light exposure may be a new therapeutically approach for GP.

doi:10.1016/j.mehy.2008.09.028

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## Ghrelin may reduce radiation-induced mucositis and anorexia in head-neck cancer: Two sides of a coin

Although Guney gave us a very good picture of using Ghrelin in the treatment of reducing radiation-induced mucositis and anorexia in head-neck cancer [1], we express some of cautious optimism about the theme. Our opinions are: (i) Ghrelin, which is primarily produced by gastrointestinal tract, has been implicated in the malignant cell proliferation and invasion, presumably through an autocrine/paracrine mechanism [2]. Malignant intesti-

nal epithelial cells differentially over-express ghrelin receptors and produce more ghrelin as compared to normal human cells, leading to their enhancing proliferative and invasive behavior. Ghrelin might play an important role in promoting malignancy [3]. (ii) Although Guney's article gave us a lot of scientific bases of employing ghrelin in the treatment of reducing radiation-induced mucositis and anorexia in head-neck cancer, some studies suggest that