# Abstract

Very few studies have investigated the relationship between women’s ability to experience an orgasm during vaginal intercourse and specific stimulation techniques. We examined two common techniques during vaginal intercourse both with and without simultaneous external clitoral stimulation: 1) *body movement*, in particular back-and-forth swinging movements of the pelvis and trunk; and 2) *precise rubbing of the clitoris with an immobilized body*. Structural equation modeling was used to compare the effects of the two stimulation techniques on women’s orgasm frequency (*N* = 1,239). As hypothesized, the frequency of orgasm during vaginal intercourse with simultaneous clitoral stimulation was positively associated with a preference for body movement during arousal. Body movement, as opposed to body immobilization, was also associated with a higher frequency of orgasm during vaginal intercourse without simultaneous clitoral stimulation. We conclude that body movement is associated with more orgasms during vaginal intercourse, whereas precise rubbing of the clitoris with an immobilized body is not associated with more orgasms. Teaching women to move their pelvis and trunk in a swinging back-and-forth movement during vaginal intercourse might therefore facilitate reaching an orgasm, whereas encouraging them to self-stimulate the clitoris might be less helpful if done with an immobilized body.

*Keywords:* Orgasm, vaginal intercourse, stimulation technique, arousal mode, Sexocorporel approach

**Body Movement is Associated With Orgasm during Vaginal Intercourse in Women**

The inability to experience an orgasm via vaginal intercourse seems to be rather common in heterosexual women. A number of factors have been associated with infrequent vaginal orgasms, ranging from genetic predisposition to anatomical traits. Although it is likely that women can alter their sexual arousal by means of different stimulation techniques and muscular activity in order to reach orgasm, surprisingly few studies have addressed the role of physical stimulation.

According to population-based studies, up to 38% of women rarely or never experience an orgasm during vaginal intercourse (Dunn, Cherkas, & Spector, 2005; Kontula & Miettinen, 2016). When asked specifically about vaginal intercourse without simultaneous clitoral stimulation, the self-reported lifetime ability to experience an orgasm is even lower, ranging from 8% to 55% (Fugl-Meyer, Oberg, Lundberg, Lewin, & Fugl-Meyer, 2006; Kontula & Miettinen, 2016). The inability to experience orgasms is associated with less pleasurable perceptions of vaginal intercourse (Kontula, 2009) and more concurrent sexual problems (Heiman, 2002; IsHak, Bokarius, Jeffrey, Davis, & Bakhta, 2010). Reported risk factors for infrequent orgasms in women include genetic predisposition (Dawood, Kirk, Bailey, Andrews, & Martin, 2005; Dunn et al., 2005), variations in anatomic traits such as urethrovaginal space (Gravina et al., 2008), pubococcygeus muscle tone (Graber & Kline-Graber, 1979), low emotional intelligence and certain personality traits (Burri, Cherkas, & Spector, 2009; Harris, Cherkas, Kato, Heiman, & Spector, 2008), poor body and genital image, and relationship difficulties (IsHak et al., 2010).

Of the few studies exploring the specific role of stimulation techniques and muscular activity, the majority have focused on the role of pubococcygeus muscle training (Chambless et al., 1984), the coital alignment technique (Pierce, 2000), or women’s mental focus on vaginal sensation during intercourse (Brody & Weiss, 2010). Findings show that muscle tension or hip motion may have variable influence on coital orgasm (Clifford, 1978; de Bruijn, 1982; Leff & Israel, 1983) and that masturbation habits involving muscle tension such as squeezing thighs or pressing the genitals against pillows or furniture seem to be associated with more difficulties to reach orgasm in partner sex (Carvalheira & Leal, 2013). Apart from these few studies, to date, the role of body movement during intercourse for women’s orgasm ability has received very little scientific attention.

This study focused on female orgasm from the perspective of the Sexocorporel approach - a sex therapy method developed by Desjardins and colleagues at the University of Quebec in the 1970s and currently widely employed in France, Switzerland, and Germany (Desjardins, Chatton, Desjardins, & Tremblay, 2010). While its theoretical basis receives support from research (Carvalheira & Leal, 2013; Hoyt, 2005; Pfaus, Quintana, Mac Cionnaith, & Parada, 2016), to date, there are no studies focusing directly on the usefulness of this approach. Sexocorporel sex therapy employs awareness training and modifications of muscular activity and stimulation techniques. From our experience in using this approach, body movement – in particular, fluid back-and-forth swinging movements of the pelvis – plays a crucial role in increasing a woman’s likelihood of experiencing an orgasm during vaginal intercourse.

**How Body Movement Can Affect Orgasm During Vaginal Intercourse**

Evidence from a number of studies and clinical observations (Clifford, 1978; Desjardins et al., 2010; Kinsey, Pomeroy, Martin, & Gebhard, 1953; Leff & Israel, 1983) suggests that women tend to rely on particular stimulation techniques to influence their sexual arousal. Any motor movements used for stimulation during sexual activities can become conditioned patterns that can facilitate orgasm (Pfaus et al., 2016). Based on records of hundreds of sexual histories acquired in clinical settings, Desjardins et al. (2010) proposed distinct categories of such arousal patterns. These arousal patterns seem to manifest themselves during sexual activities both alone and/or with a partner, particularly in a stage of high arousal just before experiencing orgasm. Each of these patterns is characterized by the type of stimulation (e.g., pressure, friction, vibration), the area of stimulation (e.g., clitoris, vulva, vagina), a specific pattern of muscular activity, as well as by movement or immobilization of the body. Arousal patterns, usually acquired in self-stimulation, appear to be highly efficient in enabling orgasm during self-stimulation. However, some patterns do not have the same effectiveness in partnered sex. Arousal and orgasm difficulties may occur, in particular, when rigidity of the body and a need for very specific stimulation patterns are involved (Chatton, Desjardins, Desjardins, & Tremblay, 2005; Desjardins et al., 2010).

Due to differences in sensory innervation, the external clitoris is sensitive to stimuli such as superficial touch, friction, pressure, or vibration (Shih, Cold, & Yang, 2013; Tajkarimi & Burnett, 2011) while the vagina and the potentially erogenous structures surrounding it (including muscles, urethra or peritoneum) appear to be more sensitive to stretch, pressure, and displacement (Goldstein, Meston, Davis, & Traish, 2005; Hoyt, 2005). It is therefore likely that stimulation techniques for sexual arousal will be different for the vagina and the clitoris.

In fact, external clitoral stimulation frequently seems to be associated with precise clitoral rubbing and body immobilization. Desjardins et al. (2010) described an arousal technique that includes rapid friction of a precise spot directly on or next to the glans clitoris. In order to attain the orgasmic threshold, the body tends to become increasingly immobilized while muscular tension is elevated. This seems to be an effective arousal technique frequently applied during masturbation (Bischof, 2012; Desjardins et al., 2010). However, clinical experience indicates that the arousal routine can be so specific that any deviation from it – like simultaneous vaginal penetration, or body movement during intercourse – can be perceived as a distraction. This might contribute to the difficulty of many women who rely on this arousal technique to experience an orgasm during vaginal intercourse (Bischof, 2012; Desjardins et al., 2010; Kontula & Miettinen, 2016).

In contrast to the effect of body immobilization, body movement seems more likely to be associated with orgasms during vaginal intercourse (Chatton et al., 2005; Desjardins et al., 2010). Desjardins et al. (2010) described an arousal technique which is characterized by circling, undulating and, most notably, back-and-forth swinging movements of the pelvis and the trunk achieved through flexion and extension of the lumbar spine with increasing muscular intensity, involving psoas and pelvic floor muscles. A variety of manual, penile, or other stimulation techniques of the vulva and/or vagina may accompany the movement. Manual stimulation of the clitoris is also common with this arousal technique, but, compared to the precise rubbing of the clitoral gland in the technique described above, it tends to be much more diverse, including larger areas of the vulva and the clitoral body (Chatton et al., 2005; Desjardins et al., 2010). The hand moves less, the body more: Stimulation may actively be supported by pelvic floor muscle contractions and pelvic movements pressing or rubbing against the hand or the penis. Moving the body during intercourse may thus facilitate a combination of external clitoral as well as internal stimulation of vaginal walls, the pelvic musculature surrounding the vagina, and internal clitoral structures (Bischof, 2012; Buisson & Jannini, 2013; Desjardins et al., 2010; Pfaus et al., 2016).

**The Current Study**

This study focused on the two above-described arousal techniques and their association with the experience of orgasms during vaginal intercourse, both with and without additional clitoral stimulation. From the arousal patterns proposed by Desjardins et al. (2010), we chose body movement, in particular back-and-forth swinging movements of the pelvis and trunk, and an immobilized body with a focus on precise rubbing of the clitoris, since these two techniques are well distinguishable from each other. Body movement seems to be associated with more, and body immobilization with fewer, orgasms during vaginal intercourse (Carvalheira & Leal, 2013; Desjardins et al., 2010). It is important to note that body immobilization is not just the absence of movement or the lack of desire to move, but a more or less conscious attempt to hold the body still, usually associated with high muscular tension and precise rubbing of the clitoral gland.

Comparison of the two arousal techniques during vaginal intercourse with and without simultaneous clitoral stimulation allows us to explore the clitoris as an additional source of arousal during vaginal intercourse. By *clitoral stimulation*, we mean stimulation of the extravaginal part of the clitoris, taking into account that internal elements ascribed to the clitoris such as clitoral bulbs and perivaginal cavernous bodies are usually automatically stimulated by vaginal penetration. As described above, the arousal mode using body immobilization and precise rubbing seems to be an effective method to experience orgasm during clitoral masturbation. In addition, women experience orgasms during vaginal intercourse more frequently when there is additional clitoral stimulation (Kontula & Miettinen, 2016; Wallen & Lloyd, 2011). However, women with a preference for clitoral stimulation tend to experience orgasms less frequently during intercourse – even with simultaneous clitoral stimulation – than women with a preference for vaginal stimulation (Kontula & Miettinen, 2016). This might be related to the arousal techniques these women apply or, more precisely, to the above described observation that penetration can be experienced as a distraction if a woman uses the technique of precise rubbing and body immobilization.

**Hypotheses**

The overall aim of this study was to explore whether and how two arousal techniques – one involving body movement and one involving body immobilization and precise rubbing of the clitoral gland – are associated with the frequency of orgasm during vaginal intercourse with and without simultaneous clitoral stimulation. First, and in line with prior findings (Fugl-Meyer et al., 2006; Kontula & Miettinen, 2016; Wallen & Lloyd, 2011), we hypothesized that women would report more orgasms during intercourse *with* in comparison to *without* simultaneous clitoral stimulation (H1). Second, we focused on intercourse *without* simultaneous clitoral stimulation. Based on the assumption that body movement facilitates stimulation of internal stretch and pressure receptors (Pfaus et al., 2016) whereas body immobilization is usually combined with clitoral stimulation (Desjardins et al., 2010), we hypothesized that body movement would be associated with a higher frequency of orgasm (H2a), whereas body immobilization would be associated with a lower frequency of orgasm (H2b). Third, focusing on intercourse *with* simultaneous clitoral stimulation, we hypothesized that body movement as an arousal technique would be associated with a higher frequency of orgasm (H3a), and that body immobilization (H3b) and precise rubbing of the clitoris (H3c) would be associated with fewer orgasms.

**Method**

**Sample and Procedure**

The current study was part of a larger online survey, focusing on the interaction of female sexual experience and behavior, both with a partner and during masturbation, taking into account numerous demographic, relationship- and health-related variables. Participants were recruited across three different German-speaking countries (Switzerland, Germany, and Austria) via a link to the online questionnaire that was circulated through mailing lists of university students and women’s organizations, websites and online-forums dealing with sex and relationships, websites with bulletin boards, and Facebook. The survey was described as an anonymous online survey of the University of Zurich exploring sexual experience, function and needs of women. Women were invited to participate to support research into a little-known field and the development of methods of sex therapy.

Inclusion criteria for the current study were 18 years or older, reporting vaginal intercourse in the previous year, and having engaged in vaginal intercourse at least 30 times in their lives. This latter criterion allowed the minimization of potentially confounding effects of sexual inexperience on frequency of orgasm during vaginal intercourse (American Psychiatric Association, 2013). As the current study focused on arousal techniques during penile-vaginal intercourse, women who reported only having had sex with women were excluded (*n* = 217). From a total of 2,340 individuals who started the online survey, 1,237 women aged between 18 and 75 years (*M* = 35.8; *SD* = 11.7) finished the entire survey and met the inclusion criteria. Of these, 919 (74 %) women stated that they were in a committed relationship. Average relationship duration was 7.1 years (*SD* = 7.1), 203 (16 %) were single, and 26 (2 %) did not report their relationship status (Table 1). All participants were informed that participation was on a voluntary basis and that discontinuation was possible at any time without any consequences. They were also told that their data was completely anonymous and would be kept confidential. No incentives were given. Study participants gave their consent by ticking a box on the landing page of the online survey. The study was approved by the Ethical Committee of the University of Zurich.

**Measures**

**Demographic variables**. The following demographic characteristics were assessed: age, education, occupation, relationship status, relationship duration, and number and age of children.

**Arousal techniques during sexual activities.** Initially, nine items were developed to assess how women arouse themselves during sexual activities. These items were based on Desjardins et al.’s (2010) proposed arousal techniques and on semi-structured interviews with female patients with orgasm difficulties. To test whether these items loaded on the expected factors (i.e., arousal techniques), we computed a series of confirmatory factor analyses. The best fitting model confirmed the three expected arousal techniques (body movement, body immobilization, precise rubbing) after deleting three items; i.e., each factor was assessed with two items indicating a good model to data fit (χ2 = 0.008; *df* = 6; *p* < .001; CFI = 0.992; TLI = 0.980; RMSEA = 0.041).

For these six items, participants were asked to agree or disagree with statements starting with: “*When I am very aroused or trying to reach orgasm during sexual activities with my/a sexual partner I feel the need to…*”*. For body movement* the sentence ended with“*…move more*” and “…*move my pelvis in fluid, round back and forth swinging movements*”. *For body immobilization* the sentences ended with “…*hold my body immobile*”; “…*hold my pelvis immobile*”. For *precise rubbing* they ended with “…*have a specific spot in my genitals stimulated very precisely*;” and “…*have my genitals rubbed with very rapid hand-movements*”. All items were assessed with a 6-point Likert scale (1 = *not at all* to 6 = *totally*). The phrasing “*When I am very aroused or trying to reach orgasm*” was used because typical arousal techniques seem to become manifest particularly right before orgasm, while in earlier stages of arousal, a larger variety of stimulation and movement may occur. The phrasing “*feel the need to*” was used to distinguish between stimulation methods a woman deems necessary for reaching orgasm and what she does during sexual activities due to other motives or her partner’s needs.

**Frequency of orgasm*.*** Participants were asked to report the frequency of orgasm during (1) vaginal intercourse without simultaneous stimulation of the clitoris and (2) vaginal intercourse with simultaneous stimulation of the clitoris. Response options ranged from 1 = *never* to 5 = *always*. Participants also reported orgasm frequency during stimulation of the clitoris in sexual activities with a partner without simultaneous penetration to test the validity of the scale of precise rubbing.

## **Statistical Analyses**

To replicate previous findings (Fugl-Meyer et al., 2006; Kontula & Miettinen, 2016; Wallen & Lloyd, 2011) showing that women achieve more orgasm during intercourse with simultaneous clitoris stimulation in comparison to intercourse without simultaneous clitoris stimulation, a t-test was used to compare the frequency of women’s orgasms in both situations. All other hypotheses were tested either by multiple regressions or with a more advanced structural equation modeling approach (SEM). We decided to use SEM (Hoyle, 2014), because this allowed us to compute body movement, body immobilization, and precise rubbing as latent factors, i.e., as “true scores” with a reliability of 1. This approach enabled us to come conceptually closer to what we think a psychological construct might constitute. Psychological constructs are latent since they cannot be directly observed. Using latent factors allowed us to mimic this by extracting what items have in common, instead of simply computing a mean. We tested a series of control variables (e.g., age, sexual satisfaction, relationship satisfaction, stressors), of which only age was significant and included in all models. The first SEM model allowed us to test how body movement and body immobilization were associated with the frequency of orgasm during vaginal intercourse *without* simultaneous external stimulation of the clitoris. As precise rubbing also implies rubbing of the external clitoris, it could not be included in this condition. (Figure 1).

The second SEM models tested how body movement, body immobilization, and precise rubbing were associated with the frequency of orgasm during vaginal intercourse *with* simultaneous external stimulation of the clitoris (Figure 2). Common fit indices were used to assess the model fit, including χ2-value for absolute model fit, Comparative Fit Index (CFI) and Tucker Lewis Index (TLI) for relative model fit, and Root Mean Square Error of Approximation (RMSEA) indicating closeness of fit (Schermelleh-Engel, Moosbrugger, & Mueller, 2003). χ2 is too sensitive for large samples (N > 300; Kline, 2011); therefore, we relied on the χ2/df ratio, which should be less than 3 (Schermelleh-Engel et al., 2003). A good or acceptable model to data fit is indicated by a CFI and TLI greater than .95 and a RMSEA less than .08 (Hu & Bentler, 1999; McDonald & Ho, 2002).

Descriptive statistics were computed using the statistic program R (R version 3.5; R Core Team, 2018); the Lavaan Package (Rosseel, 2012; version 0.5-23.1097, 2017) in R was used for the SEM model. Weighted least squares estimation (WLSMV) was used to compute the models, since the dependent variable orgasm was ordinal-scaled.

**Results**

**Descriptive Statistics and Correlation Analyses**

The socio-demographic characteristics of the sample are reported in Table 1. Table 2 shows the means, standard deviations, and inter-correlations of all study variables. The arousal technique most frequently applied by women during sexual activities with a partner was precise rubbing (*M* = 4.22, range 1-6), followed by body movement (*M* = 3.97, range 1-6), and body immobilization (*M* = 2.68, range 1-6). Frequency of orgasm during vaginal intercourse with and without simultaneous external stimulation of the clitoris correlated significantly (*r* = .45, *p* < .01). Both showed a significant positive association with body movement (*r* = .27, *p* < .01; *r* = .23, *p* < .01) and a negative association with body immobilization(*r* = -.19, *p* < .01; *r* = -.16, *p* < .01). Precise rubbing was not correlated with the frequency of orgasm during vaginal intercourse with simultaneous stimulation of the clitoris but correlated positively with body immobilization (*r* = .20, *p* < .01) and negatively related with body movement (*r* = -.14, *p* < .01).

**Likelihood of Orgasm During Vaginal Intercourse**

*Hypothesis 1*. Results from the t-test show that women experienced significantly more orgasms during vaginal intercourse with simultaneous stimulation of the clitoris (*M* = 3.89, range 1-5) compared to vaginal intercourse without clitoral stimulation (*M* = 2.64; range 1-5; *t*(25.2) = 1.21, *p* < .001; H1).

*Hypothesis 2.* Our first SEM model regarding the frequency of orgasm during vaginal intercourse *without* simultaneous external clitoral stimulation showed a good fit to the data (χ2 = 6.5; *df* = 5; *p* = 0.258; CFI = 0.998; TLI = 0.994; RMSEA = 0.019, C.I. [90] .000 - .054; Figure 1). In line with our hypotheses, body movement was positively associated with frequency of orgasm (β = .70, *p* < .01; H2a), whereas body immobilization was not (β = -.15, *p* = .14; H2b).

*Hypothesis 3.* The second model examining the frequency of orgasm during vaginal intercourse *with* simultaneous external clitoral stimulation also showed a good fit to the data (χ2 = 20.6; *df* = 12; *p* = 0.056; CFI = 0.988; TLI = 0.972; RMSEA = 0.031, C.I. [90] .000 - .053; Figure 2). In line with our predictions, body movement was significantly associated with orgasms (β = .58, *p* < .01; H3a), whereas neither body immobilization (H3b) nor precise rubbing (H3c) was associated with more frequent orgasms after controlling for the effects of body movement and age.

**Discussion**

Several factors associated with infrequent orgasm during vaginal intercourse have been identified (IsHak et al., 2010). To the best of our knowledge, however, the present study is the first to assess the importance of the two arousal techniques of body movement and body immobilization with precise rubbing for frequency of female orgasm during vaginal intercourse. As hypothesized, the frequency of orgasm during vaginal intercourse with simultaneous clitoral stimulation was positively associated with a preference for body movement during arousal, but not with a preference for precise rubbing with an immobilized body. Body movement was also associated with a higher frequency of orgasm during vaginal intercourse without simultaneous clitoral stimulation.

**The Effect of Arousal Techniques on Women’s Orgasm during Vaginal Intercourse**

In line with previous studies, women were more likely to report a higher frequency of orgasm with simultaneous clitoral stimulation during vaginal intercourse in comparison to vaginal penetration alone (Fugl-Meyer et al., 2006; Wallen & Lloyd, 2011). This finding might be attributed to the higher total amount of receptors elicited in combined clitoral-vaginal stimulation.

During vaginal intercourse without simultaneous external stimulation of the clitoris, results indicated a positive association between frequency of orgasm with body movement and a negative association with body immobilization. Moving the trunk and the pelvis during sexual activity seems to facilitate stimulation of the vaginal walls, the internal clitoral complex, and the receptors in the pelvic musculature surrounding it (Bischof, 2012; Buisson & Jannini, 2013; Desjardins et al., 2010; Pfaus et al., 2016), thereby reducing the need for additional external clitoral stimulation. While some stimulation of the clitoral gland will also take place during vaginal intercourse due to muscular activity, movement and sexual position (Levin, 2003), the vagina is an important focus of stimulation.

We further tested the influence of arousal techniques during vaginal intercourse *with* simultaneous external stimulation of the clitoris. Women reporting more body movement also reported more orgasms whereas no effects were found for body immobilization or precise rubbing. This reflects our clinical experience that women who use body immobilization and precise external stimulation of the clitoris to arouse themselves are more likely to feel disturbed in their arousal routine by vaginal penetration (Bischof, 2012; Desjardins et al., 2010), while this technique can be a reliable means of stimulation to experience clitoral orgasms in sexual situations without penetration. Finally, we found that women reported a greater preference for precise rubbing than for body immobilization. This might be due to women being more aware of performing precise rubbing than of immobilizing their body during sexual activities.

**The Role of Movement During Sexual Arousal**

Overall, our study results corroborate the reflections of Desjardins et al. (2010) regarding the facilitation of sexual arousal and orgasm through movement of the pelvis and trunk. The importance of body movement for sexual arousal was recognized more than 60 years ago by Alfred Kinsey, who from his observations of men and women experiencing orgasm concluded that “not a few females have also learned that voluntary contractions of their buttocks and movements of the pelvis may develop their erotic reactions and even effect orgasm in masturbation, petting, coitus, and homosexual activities” (Kinsey et al., 1953; p. 619). Kinsey and others described muscular tension as both a prerequisite for and a consequence of genital sexual arousal (Giuliano, Rampin, & Allard, 2002; Masters & Johnson, 1966). Some women reach orgasm predominantly through continuous muscular contraction, often by squeezing their legs together or pressing their genitals against objects (Carvalheira & Leal, 2013; Desjardins et al., 2010; Kinsey et al., 1953). Others condition themselves to clitoral rubbing with an immobilized body, also using continuous muscle tension.

While these techniques are very effective in solitary sex, they may limit the experience of pleasure and orgasm in vaginal intercourse (Bischof, 2012; Carvalheira & Leal, 2013; Desjardins et al., 2010). A number of physiological mechanisms may be accountable for this. Continuous strong contraction of skeletal muscles occludes arterial inflow by means of intra-muscular pressure, leading to muscular hypoxia, which may feel uncomfortable (Humphreys & Lind, 1963). In a rigid body, breathing is shallow and generalized hypoxia prevails, possibly activating the sympathetic nervous system beyond the optimal level supporting sexual arousal (Lorenz, Harte, Hamilton, & Meston, 2012; Ulrich-Lai et al., 2010), inducing stress rather than an experience conducive to sexual pleasure (Ter Kuile, Vigeveno, & Laan, 2007). While the role of elevated muscle tension in emotions is discussed controversially, it has been shown to be able to decrease central processing of nociceptive and possibly also pleasurable sensations (Knost, Flor, Birbaumer, & Schugens, 1999; Pluess, Conrad, & Wilhelm, 2009). This may contribute to why some women hardly perceive their genital arousal and have difficulties reaching orgasm during vaginal intercourse (Brotto, Chivers, Millman, & Albert, 2016; Laan & Everaerd, 1995). Pelvic floor hypertension decreases the elasticity of the vaginal opening and restricts blood flow to the lower third of the vagina, thus diminishing lubrication and potentially entailing dyspareunia which can further negatively impact the experience of vaginal intercourse (Bischof, 2012; Reissing, Brown, Lord, Binik, & Khalifé, 2005).

These adverse effects of continuous muscular contraction can be avoided through body movement during arousal which, by its constant cycle of contraction and relaxation of muscles and their antagonists, prevents rigidity, raises blood flow to skeletal muscles, and may enhance interoception (Bischof, 2012; Rådegran & Saltin, 1998; Rosenbaum, 2007). Back-and-forth swinging movements of the pelvis in particular involve muscles that favor blood flow to the pelvic region, i.e. the psoas major muscle, the lower abdominal muscles, and the pelvic floor. This movement has been shown to activate the parasympathetic nervous system which may contribute to sexual function, as vagal activity has been shown to be higher in sexually functional than sexually dysfunctional women (Cottingham, Porges, & Richmond, 1988; Stanton, Pulverman, & Meston, 2017). Pelvic floor movement supports sexual arousal during vaginal penetration (Bischof, 2012; Desjardins et al., 2010; Pfaus et al., 2016). These mechanisms may account for our current finding that body movement is associated with more orgasms during vaginal intercourse and may be an explanation for why the use of movement as a therapeutic strategy for coital orgasm in Sexocorporel therapy appears to be effective.

In our study, the need for precise rubbing during arousal was positively correlated with the need for body immobilization and negatively with the need for trunk and pelvic movement. This is in accord with our clinical experience that women who rely on precise clitoral rubbing are likely to hold their body immobile in elevated muscular tension. While body movement fosters blood circulation and pleasurable perception throughout the body, precise rubbing in a state of immobilization and elevated muscular tension will focus perception on a restricted area around the external clitoris. This observation is reflected by studies in which women describe orgasms through stimulation of the external clitoris to be more concentrated to this area, whereas orgasms via vaginal stimulation are described as more of a whole-body-experience (Fugl-Meyer et al., 2006; Komisaruk, Beyer-Flores, & Whipple, 2006).

**Clinical Implications**

The role of moving the trunk and pelvis to help the experience of an orgasm during vaginal intercourse has important implications for the treatment of coital anorgasmia. While our results are in line with findings that women report more orgasms during vaginal intercourse when there is concurrent clitoral stimulation (Kontula & Miettinen, 2016) and show that external clitoral stimulation can be an added source of arousal during vaginal intercourse, they further highlight that moving the body is also likely to add to genital sexual arousal. Assuming arousal techniques influence the occurrence of orgasm during vaginal intercourse, women can be taught to increase their genital sexual arousal as hip and trunk movements and pelvic floor contractions during sexual arousal can become conditioned patterns that predict orgasm (Pfaus et al., 2016). Disadvantageous arousal techniques may likewise have been conditioned and therefore may be difficult to change on command. Thus, practice becomes an important element of therapy. Sexual stimuli can be conditioned through repetition, and motor patterns can be changed, provided there is alternate reinforcement and sufficient practice (Georgiadis & Kringelbach, 2012; Pfaus et al., 2012).

While not every woman is interested in experiencing orgasm during vaginal intercourse (de Bruijn, 1982), those interested might benefit from practicing new arousal techniques during masturbation. In the Sexocorporel sex therapy method, arousal patterns both during masturbation and partner sex are elicited by a therapist through precise questions. If they involve body immobilization and high muscle tension, they are considered likely to contribute to a sexual problem through the mechanisms described above. In our clinical practice, coital anorgasmia, low sexual desire, sexual anhedonia and dyspareunia can be associated with body immobilization and high muscle tension. In Sexocorporel therapy, appropriate modifications of the arousal pattern through physical inductions and exercises are encouraged.

The movement pattern most conducive to raising arousal during vaginal intercourse is the **“**pelvic swing”, where the pelvis is retroverted with expiration/contraction of pelvic floor muscles and anteverted with inspiration/relaxation of pelvic floor muscles in fluid back-and-forth swinging movements (Bischof, 2012; Desjardins et al., 2010; Lowen & Lowen, 2003). In our clinical experience, this pattern is also associated with a subjective experience of higher degrees of sexual pleasure. Similarly, the coital alignment technique proposed by Eichel and colleagues (Eichel, Eichel, & Kule, 1988; Pierce, 2000) is characterized by “slow, rhythmic, gliding back-and-forth rocking motion” of the body during vaginal intercourse in which both partners are equally active (Kaplan, 1992, p. 285). Kaplan specifically recommended this technique to “anorgasmic women who do not thrust their pelvis actively during vaginal intercourse” (p. 290). We assume that the encouragement to move the pelvis explains why this technique has been shown to be somewhat more effective in treating coital anorgasmia than encouraging women to self-stimulate during vaginal intercourse (Hurlbert & Apt, 1995).

In addition to movement of the pelvis and of pelvic floor muscles in association with deep abdominal breathing, recommendations can include stimulation of the outer and inner genitalia, as well as mindful focusing on interoceptive awareness (Bischof, 2012). Sexocorporel therapy is aimed at improving the women’s perception and sexual technique rather than suggesting that the partner stimulate her in a precise way. It suggests learning steps towards a new conditioning that includes more varied stimulation and movement. Future intervention studies should examine whether women are willing to adopt new arousal techniques as well as whether those arousal techniques lead to more orgasms in these women.

# Strengths and Limitations

This study had a number of methodological and conceptual strengths, supporting our findings. First, we used a sophisticated method to analyze our data, enabling us to examine associations on a latent level. Furthermore, the sample size was large, thereby allowing us to generalize our findings to a broad range of women. Finally, we conceptualized and tested a crucial and so far understudied aspect of how women can increase their arousal during vaginal intercourse.

Despite these strengths, there are also several limitations. First, we assessed a convenience sample, which may limit the generalizability of our results to general or clinical populations. Furthermore, the study used cross-sectional data only. Even though we theoretically and statistically assume that the way a woman raises her arousal will influence her ability to experience orgasms, the results cannot be interpreted in a causal way. In addition, we relied on self-report data. Ideally, future research would use objective measures of genital arousal. Due to the limited number of questions, factors such as exact type, source and location of stimulation or changes of stimulation during arousal were not assessed. Also, no questions were asked about the sexual behavior and functioning of the women’s sexual partners, or the duration of foreplay and vaginal intercourse, factors previously shown to influence women’s sexual functioning and ability to reach orgasm during partnered sex (de Bruijn, 1982; Kontula & Miettinen, 2016; Laan & Rellini, 2011). Finally, there might be alternative explanations for the association of body movement with higher orgasm frequency during vaginal intercourse. For example, a woman might feel the need to move her body during arousal because she senses that her partner finds it arousing, which in turn might raise her arousal. However, we found that the women moving and experiencing more orgasms during vaginal intercourse also moved more during masturbation (Bischof-Campbell, 2012), which may point to movement itself being experienced as pleasurable and arousing.

**Conclusions**

Based on our results we conclude thatbody movement isconducive to orgasms during vaginal intercourse in women regardless of their reliance on simultaneous external stimulation of the clitoris. While no definite conclusions can be drawn from our results, they support clinical observations and invite further research on the topic, ideally including objective measures. The clinical implication is that teaching women to move their pelvis and trunk back-and-forth in swinging movements is more likely to add to their arousal during vaginal intercourse, whereas the encouragement to self-stimulate the clitoris during vaginal intercourse will not necessarily lead to more orgasms, if it is done with an immobilized body.

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FIGURE CAPTION

*Figure 1*. From the two latent factors body movement and body immobilization, only body movement was significantly associated with the frequency of orgasm during vaginal intercourse *without* simultaneous clitoral stimulation.

*Figure 2*. From the three latent factors body movement, body immobilization, and precise rubbing, only body movement was significantly associated with the frequency of orgasm during intercourse *with* simultaneous clitoral stimulation.