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Vibroacoustic Therapy (Olav Skille) in Menopause: Evidence and Recommendations

Executive Summary

Vibroacoustic therapy (VAT) – the delivery of low-frequency sound vibrations to the body – was pioneered by Olav Skille in the 1960s [1]. TheSoundWell Vibro-therapy is a US distributor of Skille's original equipment (mats, recliners, pillows and "sonic pets") that transmit harmonic sine-wave frequencies (typically 30–120 Hz) to the whole body [2] [1]. A growing body of research (primarily on whole-body vibration or VAT) suggests potential benefits for menopausal women. For example, controlled trials report modest improvements in bone density and strength [3] [4], reductions in insomnia severity [5], and amelioration of depressive symptoms and stress [6] [7]. Proposed mechanisms include mechanoreceptor ("pallesthesia") stimulation and parasympathetic activation [8] [7], which could improve thermoregulation, sleep and mood. VAT is generally low-risk (common precautions: avoid during pregnancy, active acute illness or implants) [9] and sessions are typically 20–30 minutes several times per week. Compared to established non-hormonal therapies (SSRIs, SNRIs, gabapentin, CBT, acupuncture, etc.), VAT is non-pharmacologic and integrative; however, clinical evidence in menopausal women remains limited. We provide a detailed review of TheSoundWell/Skille materials, summarize all relevant studies on VAT and whole-body vibration in menopause (hot flashes, sleep, mood, bone health, urinary symptoms), and discuss physiological mechanisms. We include comparative tables of studies and clinical recommendations (indications, contraindications, protocols), and propose priority research questions and an RCT design to fill the evidence gaps.

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timeline
    title Key Milestones in Vibroacoustic Therapy Development
    1968 : Olav Skille conceives low-frequency sound-body massage (Norway) [8]
    1987 : Skille publishes first vibroacoustic research (Music Therapy Journal) [1]
    1990s : Commercial VAT devices developed (e.g. Multivib, Embodi-Mat) [1]
    2004 : Rubin et al. RCT – 30Hz WBV prevents bone loss in postmenopausal women (~70 subjects) [3]
    2012 : Lai et al. RCT – WBV (30Hz, 5min thrice/week, 6mo) + exercise increases spine BMD (+2.0% vs –0.05% control) [3]
    2013 : Ruan et al. trial – WBV + alendronate modestly improves lumbar BMD in osteoporotic women [4]
    2015 : Weber-Rajek *et al.* review – summarizes WBV trials in postmenopause (mixed bone outcomes) [3]
    2018 : Delmastro et al. – small VAT study shows relaxation (↑HRV) [10]
    2020 : Zabrecky *et al.* RCT – 1-mo VAT (insomnia patients) improves sleep duration and insomnia scores [5]
    2022 : Kantor *et al.* RCT – 20-min VAT (students) increases parasympathetic
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HRV (stress reduction) [7]
    2024 : Wang *et al.* RCT – 4-wk VAT+music (depression) yields greater mood
and autonomic improvements than control [6]
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Menopause and Nonhormonal Therapies

Menopause (ovarian failure) brings **vasomotor symptoms** (hot flashes, night sweats), insomnia, mood swings, cognitive "fog", sexual dysfunction (vaginal dryness, low libido), bone loss (osteopenia/osteoporosis), cardiovascular risk and urinary issues. Vasomotor symptoms affect up to ~80% of women [11] and are linked to thermoregulatory instability in the hypothalamus due to estrogen withdrawal. Estrogen also modulates neurotransmitters (serotonin, norepinephrine) and bone remodeling (via RANKL/OPG pathways). Hormone therapy (HT) is most effective for symptoms, but many women cannot or choose not to use HT. Current nonhormonal treatments include antidepressants (SSRIs/SNRIs), gabapentinoids, clonidine, phytoestrogens (e.g. soy, black cohosh), acupuncture, mindfulness/CBT, and novel agents (e.g. neurokinin-3 antagonists) [12] [13] . Each of these has modest efficacy or side-effects. **Vibroacoustic therapy** represents a novel physical modality: it is drug-free, non-invasive and targets the sensory/autonomic system. It has been investigated for stress, pain and neurological conditions, but its use in menopause is still exploratory.

Olav Skille's Vibroacoustic Therapy & TheSoundWell Products

History and Concept. Vibroacoustic therapy was conceived by Norwegian engineer Olav Skille in 1968. Skille devised a method of **delivering low-frequency sound** (sine waves 30–120 Hz) directly to the human body via transducers/speakers in contact with the skin [1] . He defined VAT as "giving the whole body a massage" by low-frequency vibrations propagating through the body's 70% water content [8] . According to Skille, such vibrations reach deep tissues and organs "not reachable with traditional methods" [8] , potentially improving circulation, relaxation and homeostasis. Skille's early papers (1980s–1990s) described improvements in pain, spasticity, and neurological disorders with this method.

TheSoundWell & Multivib. In Norway, Skille's technology was commercialized by Multivib AS (Trondheim). Multivib sells equipment (mats, loungers, waterbeds, pillows) with built-in transducers, along with audio "programs" of specific frequencies. Skille's low-frequency programs (e.g. "Secret", "Relax-ME") are now available via apps. TheSoundWell Vibro-therapy (Boca Raton, FL) is the US representative of Skille's VAT. They manufacture and sell "sonic ergonomic" products (recliners, mats, pillows, even "sonic pets" and blankets) that embed Multivib/Multi-frequency transducers [2] . For example, the SoundWell Vibro-Mat (6 transducers) is a foldable mat (75″×27″) with 7 built-in "low-frequency sound compositions" by Skille [14] . When users lie on it, a tablet plays sine-wave music while vibrations transmit through the body. These devices are intended for general wellness: e.g. relaxation, stress relief, and pain reduction [14] . TheSoundWell emphasizes training and prescribed frequency programs for specific conditions (e.g. a "Menopause Hot Flashes" program [15]).

Equipment Parameters. Skille's VAT typically uses sinusoidal pure tones, not random noise, in the "theta/delta" range (often 40–60 Hz, up to 120 Hz) [1] . TheSoundWell states their devices output "harmonic low sound frequencies" via speakers/mats [2] . In practice, whole-body vibration (WBV) studies often used 20–40 Hz with amplitudes of a few millimeters (Galileo platform 12–36 Hz, amplitude 1–12 mm [16]). Skille's approach focuses on sound (audio) but the transducers also mechanically vibrate the body. The FDA has

noted VAT devices are akin to vibration therapy devices and are *not formally approved* for medical claims [17] (customers are advised to consult physicians for any health use [9]).

Evidence for Vibroacoustic Therapy in Menopause-Related Outcomes

<table> <tr><th>Outcome Domain</th><th>Evidence (Design, Population)</th><th>Intervention</th><th>Result / Effect</th><th>Caveats</th></tr>

<tr><td>Bone Density / Osteoporosis</td><td>Multiple RCTs and reviews in postmenopausal women</td><td>Whole-body vibration or vibroacoustic (e.g. 30–40 Hz, 2–3×/wk, ~5–15 min/session + exercise)</td><td>Modest increases in BMD at hip/spine vs controls. For example, Lai *et al.* (2012) found lumbar spine BMD +2.0% vs –0.05% control (p=0.047) after 6 mo [3] . Gusi *et al.* (2006) saw femoral neck BMD +4.3% vs 0% in walking controls (p=0.011) over 8 mo [4] . Meta-analyses report small hip-BMD gains (~1–4%) and improved muscle strength [18] [19] .</td><td>Studies often combine vibration with exercise; results vary by protocol. Effects are small (a few percent BMD) and sometimes not all replicable. Most evidence is from mechanical WBV; direct low-sound studies are sparse. </td></tr>

<tr><td>Sleep Disturbance / Insomnia</td><td>One RCT in older insomniacs</td><td>Daily vibroacoustic sessions (device: vibro-bed) for 1 month vs waitlist</td><td>Significant improvements in sleep duration and insomnia scores. Zabrecky *et al.* (2020): VAT group had more sleep minutes and lower Insomnia Severity Index than controls [5] . fMRI showed changes in brain connectivity associated with sleep centers.</td><td>Small study (N=30); not specific to menopausal women (general insomnia). Protocol details (duration, music content) vary. However, supports VAT's sleep-promoting effect.</td></tr>

<tr><td>Mood / Depression / Anxiety</td><td>1 RCT in depressed adults; plus stress studies</td><td>Somatosensory music therapy (vibroacoustic): 30-min sessions, 3×/wk for 4 wk + standard care vs standard care alone [20] . Also, RCT (n=54) in students: 20-min VAT vs sham audio</td><td>Improvement in depression and emotion. In Wang *et al.* (2024), the VAT group's Hamilton Depression scores fell more than control (p<0.05) and positive emotion ↑ while stress ↓ [6] . Kantor *et al.* (2022) reported that a single 20-min VAT session significantly increased HRV (parasympathetic activity) vs placebo [7] , indicating relaxation. Other case reports note anxiety/stress relief.</td><td>VAT was adjunctive to medication in Wang's trial; the control also received treatment, so VAT provided extra benefit. Depression study lacked menopause focus. Stress/RCT had healthy students. Nonetheless, suggests VAT can modulate mood via autonomic balance.</td></tr>

<tr><td>Vasomotor (Hot Flashes)</td><td>No RCTs in menopause-collection; anecdotal evidence</td><td>Multi-vib pilot (Norway): 10 sessions (23 min "Secret" program) in perimenopausal women [21] </td><td>Positive symptomatic reports. Troen (Multivib) reported that 8 of 24 women "got rid of" one or more menopausal problems (hot flashes, insomnia, mood swings, sexual issues, etc.) after 10 sessions [22] . Patients noted some hot flash reduction and improved sleep.</td><td>Non-peer-reviewed company data with no control group. Self-reported outcomes on a 1–10 scale. Suggestive only. No published trials isolate VAT effects on vasomotor symptoms. In contrast, non-drug VMS therapies (e.g. CBT, hypnosis) have some RCT evidence [12] .</td></tr>

<tr><td>Urinary / Pelvic Floor</td><td>1 RCT (stress urinary incontinence)</td><td>WBV training (4 weeks) vs pelvic floor exercises [23] </td><td>WBV improved pelvic floor muscle strength and quality of life, comparable to conventional exercises [24] . Both groups saw reduced incontinence severity and better I-QOL scores.</td><td>Study used mechanical vibration (platform), not sound VAT. Nonetheless, vibration appears beneficial for pelvic floor. No studies on VAT sound effects for urinary symptoms.</td></tr>

</table>

Each of these outcomes may be interrelated in menopause: for example, reduced sleep disturbance and stress by VAT might indirectly lessen perceived hot flashes. However, **no controlled trials** have tested vibroacoustic therapy specifically for menopausal VMS, cognitive symptoms, sexual function or overall quality of life. The available data come mostly from mechanical vibration (WBV) in older women and from general VAT trials (insomnia, depression, stress) in non-menopausal subjects. This evidence is therefore **indirect** but hypothesis-generating.

Proposed Mechanisms of Action

Several physiological pathways have been proposed for how low-frequency vibrations could alleviate menopausal symptoms:

- **Mechanoreceptor Stimulation ("Pallesthesia").** VAT stimulates deep pressure receptors (Pacinian corpuscles) in skin and muscle. Skille emphasized that the body senses low-frequency vibration ("pallesthesia") as a special input. Research suggests this sensory barrage can enhance parasympathetic activity and brain relaxation. For instance, Kantor *et al.* found that a 20-min VAT session statistically increased heart-rate variability (a marker of vagal tone) [7] . Increased parasympathetic drive could counteract the sympathetic surges that trigger hot flashes. A proposed mechanism is direct somatosensory input to the hypothalamus, stabilizing thermoregulatory centers.

- **Brainwave Entrainment / Neural Effects.** Some VAT programs incorporate music or rhythm. The Zabrecky fMRI study observed that VAT altered resting-state connectivity in cerebellum, thalamus, sensorimotor and prefrontal regions [5] . Others have suggested that sinusoidal vibrations may entrain alpha/theta brain rhythms (analogous to binaural-beat or meditation effects), promoting calmness. Importantly, in the insomnia trial, VAT improved objective sleep measures, implying a central effect on sleep architecture [5] .

- **Endocrine / HPA Axis Modulation.** There is indirect evidence that VAT can reduce stress markers. For example, Wang *et al.* reported that VAT increased heart rate variability (SDNN, RMSSD) more than controls [25] , indicating lower sympathetic activation. Other small studies of vibroacoustic relaxing music show decreases in cortisol after sessions. Chronic stress/excess cortisol can worsen vasomotor and mood symptoms; thus VAT's relaxing effect may rebalance the HPA axis. (However, one study found only slight cortisol changes after a single session.)

- **Musculoskeletal / Bone Effects.** Mechanical vibration transmits minute oscillatory forces to bone, which (via the piezoelectric effect) stimulates osteoblast activity. This is well-documented in WBV research. Indeed, reviews note that WBV in postmenopausal women can raise growth hormone and

testosterone [19] – hormones that decline with age and estrogen loss – and thus support bone and muscle. VAT devices similarly produce bodily oscillations. Therefore, regular VAT might attenuate menopausal bone loss. For example, in a meta-analysis, WBV raised hip BMD in menopausal women [18], an effect likely due to mechanical (not auditory) stimulation of bone cells.

- **Autonomic / Thermoregulatory Effects.** Vasomotor symptoms stem from hypothalamic thermoregulatory narrowing after estrogen loss. By increasing parasympathetic tone and possibly enhancing hypothalamic GABAergic signaling (as some non-drug therapies do), VAT could expand the thermo-neutral zone. Although direct data are lacking, the combination of relaxation, improved sleep, and autonomic balance from VAT might reduce the frequency/intensity of hot flashes.

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graph LR
    A[Low-frequency Vibration<br/>(30–120 Hz)]
    A --> B[Mechanoreceptors (Pacinian corpuscles)]
    B --> C[Parasympathetic Activation]<br/>(↑HRV, relaxation)
    A --> D[Brain Entrainment]<br/>(thalamus/hypothal.)
    D --> C
    A --> E[Muscle/Bone Vibration]
    E --> F[Bone Remodeling]<br/>(↑Osteogenesis)
    E --> G[Muscle Strength/Balance↑]
    C --> H[↓Sympathetic Tone]
    H --> I[Improved Thermoregulation]
    C --> J[Reduced Stress & Anxiety]
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Figure: Hypothesized mechanisms by which low-frequency sound vibration (Vibroacoustic Therapy) may alleviate menopausal symptoms. VAT engages mechanoreceptors and neural circuits to boost parasympathetic tone [7], as well as providing osteogenic mechanical stimulation [19]. The net effect is relaxation, better sleep and possibly reduced vasomotor and bone loss effects.

Safety, Contraindications, and Dosing

VAT (like mechanical WBV) is generally well-tolerated. Reported side-effects are minimal (some users feel mild disorientation or sweating). No serious adverse events have been linked to low-frequency vibroacoustic sessions in healthy adults. However, standard precautions apply:

- **Contraindications:** Pregnancy (fetal risk from vibrations) is a clear contraindication. Also avoid VAT if you have an implanted medical device (pacemaker, defibrillator, cochlear implant) unless cleared by a doctor. Acute conditions such as thrombosis, acute inflammatory disease, recent fractures or surgery, uncontrolled hypertension/arrhythmia, or epilepsy may preclude use. TheSoundWell cautions users with “chronic illness or acute condition that may be impacted by low sound frequencies” to consult a physician [9].

- **Session Parameters:** Published studies vary, but common protocols are 20–30 minutes per session. Wang *et al.* used 30-min sessions 3×/week [26]. Zabrecky’s RCT details are sparse but likely daily or frequent short sessions. For bone, some studies used very brief protocols (e.g. 5 min, 3×/wk [3])

whereas others used longer (15–30 min) sessions. In practice, many VAT systems (like the Vibro-Mat) include pre-set 20–25 minute programs. Frequencies of 30–60 Hz are common in VAT music programs, though higher frequencies up to ~120 Hz have been used. Amplitude (vibration intensity) on VAT beds/mats is typically moderate (a few mm displacement), sufficient to feel the oscillation but not enough to knock one over.

- **Dose-Response:** There are no established "doses" of VAT. Available studies suggest *more* frequent sessions yield greater benefit. In the Norwegian pilot, 10 sessions (2–3×/wk) produced gains, and women who continued maintenance sessions reported sustained relief [22]. It may be prudent to start with 20 min, 2×/week and assess tolerance. Heart rate and blood pressure should be stable (VAT can slightly raise systolic pressure during the session, as one study noted [5]). Monitor for any increased palpitations, dizziness or nausea.

- **Regulation:** VAT devices for "wellness" are generally **not FDA-approved** for treating medical conditions [17]. They are typically sold as relaxation/fitness products. Clinicians should emphasize that VAT is an **adjunct**, not a substitute for medical therapy, and that claims are preliminary. TheSoundWell's disclaimer explicitly states the equipment is not intended to diagnose or cure disease, and advises independent research [9].

Comparison to Other Nonhormonal Therapies

For each menopausal symptom, VAT can be viewed alongside existing options:

- **Hot Flashes:** First-line non-HT options include SSRIs/SNRIs (e.g. paroxetine, venlafaxine), gabapentin or pregabalin, and cognitive-behavioral therapy (CBT) or hypnosis. These can reduce hot flash frequency by 40–60% on average [12], but often with side-effects (dry mouth, fatigue, nausea for meds). VAT offers a *complementary* approach: no known drug side-effects, and may help by a different route (sensory relaxation). Unlike acupuncture or stellate ganglion block, VAT is non-invasive and self-administered. However, unlike SSRIs there is no large trial showing 50% reduction. At best, VAT might produce mild-to-moderate symptomatic relief (similar to CBT's ~40–50% perceived improvement [12]), but this remains to be tested.

- **Sleep Disturbance:** Many women take sedating meds or melatonin. CBT-insomnia is effective but resource-intensive. VAT has some RCT support for improving sleep in insomnia [5]. It may offer a gentle relaxation method to augment sleep hygiene. Unlike hypnotics, VAT should not cause rebound insomnia or dependency. No head-to-head trials exist, so VAT is best seen as a supportive tool (perhaps used in the evening before bed).

- **Mood/Anxiety:** SSRIs/SNRIs also treat depression and anxiety, but have sexual side-effects. VAT's reported benefits on mood (enhanced positive affect, reduced stress) [6] [7] are comparable to the relaxation achieved by massage or music therapy. For an anxious woman seeking non-drug help, VAT could be offered similarly to a meditation/yoga class (for stress reduction).

- **Bone Health:** The only established bone-loss interventions are exercise, calcium/Vitamin D, and osteoporosis medications (bisphosphonates, denosumab). WBV has some evidence for slowing bone loss [3]. VAT could be viewed as a form of passive musculoskeletal stimulation. It may be considered

akin to recommending gentle weight-bearing exercise; however, VAT is not a substitute for pharmacologic therapy in osteoporosis. The small BMD gains seen with vibration (<5%) are supplementary to other measures.

- **Urinary:** Pelvic floor exercises (Kegel) and biofeedback are standard. A WBV RCT showed improvements in stress incontinence [24], possibly by reflexively engaging core/pelvic muscles. If validated, VAT might similarly activate pelvic floor (through whole-body muscle contractions). For now it should not replace targeted pelvic rehab, but could be an adjunct.

In summary, vibroacoustic therapy is **most analogous to other mind-body or physical modalities** (like acupuncture, mindfulness, exercise, massage) rather than to drugs. It has the appeal of being passive (you relax on a mat) with very low risk. Compared to "wellness" treatments like biofield therapies, VAT has a growing evidence base (see above), but to date no large trials in menopause specifically. Patients should be counseled that VAT is experimental: possible benefit, no major known harms, but also no guarantee.

Practical Recommendations for Clinicians and Patients

Indication/ Use	Notes / Rationale	Contraindications	Suggested Protocol	Monitoring
Vasomotor symptoms	May reduce stress-triggered flashes via relaxation. Anecdotal relief reported [22]. Best as adjunct to other measures (cooling strategies, CBT, etc.).	Pregnancy; acute illness/infection; pacemaker/ implants; uncontrolled HTN.	20–30 min sessions, 2–3×/week initially, listening to Skille's relaxation programs [26]. Possibly increase frequency if tolerated.	Keep hot flash diary (frequency/ intensity). Monitor symptom scales (e.g. Menopause Quality of Life). Adjust as needed.
Sleep disturbance	Improves sleep duration and insomnia scores in one trial [5]. Use 20–30 min VAT in evening.	Same as above.	20–30 min before bedtime, up to nightly (if helpful). Use calming frequency tracks (e.g. 40Hz).	Sleep logs or actigraphy. Use Insomnia Severity Index to quantify changes.

Indication/ Use	Notes / Rationale	Contraindications	Suggested Protocol	Monitoring
Mood / Anxiety / Stress	Clinical studies show VAT + music reduced depression and stress [6] [7]. Use as relaxation therapy.	Moderate severe depression may still need meds; same physical contraindications.	20–30 min, 3×/week sessions with depressive/ emotional well-being program [26].	Standard depression/ anxiety scales (HAM-D, GAD-7, HRV monitoring if available) to track.
Bone health / Osteoporosis	Adjunct to weight-bearing exercise. Some WBV trials show small BMD gains [3]. VAT could supplement exercise.	Skeletal fragility (e.g. recent fracture) caution.	5–15 min of 30–40Hz vibration 3×/week (as in Lai *et al.* [3]) on a mat/device. Combine with resistance training.	Bone density scans (DXA) annually or per osteoporosis guidelines. Track falls/ muscle strength (e.g. balance tests).
Urinary incontinence	WBV improved pelvic floor strength and incontinence severity [24]. VAT might similarly engage core muscles reflexively.	Same as general vibration contraindications.	5–10 min vibration (full-body standing or lying) 3×/ week, as tolerated. Combine with Kegel exercises.	Patient diary of leakage episodes; pelvic floor muscle exam if available.
Sexual dysfunction	VAT purported to increase "sexual sensitivity" (TheSoundWell claim) [15]. Rationale: improved blood flow and relaxation may benefit arousal.	Pelvic/vulvar pain (unless ruled safe); same overall.	Gentle 20 min VAT session (possibly with partners); focus on relaxation program.	Sexual function questionnaires (FSFI) and patient feedback.

Protocol Notes: TheSoundWell and study protocols commonly use *low-frequency sine waves* (30–60 Hz) combined with music. One study used 3×30-min sessions/week [26]; another effective dose in WBV was 3×5 min/wk [3]. For VAT machines, start with the lowest comfortable amplitude. Gradually increase session

length (up to 30 min) and frequency of visits if beneficial. It is reasonable to continue VAT for at least 3–6 months to assess effects on chronic symptoms.

Contraindications: As noted, avoid during pregnancy, recent surgeries, acute cardiovascular/neurological events, and in people with electronic implants. TheSoundWell's website explicitly warns that *"if you have a chronic illness or acute condition that may be impacted by our low sound frequencies…you should get medical doctor confirmation to use our equipment"* [9] . Patients on anticoagulants or with severe osteoporosis should also use caution (vibration can rarely trigger bleeding in advanced disc disease or aneurysm, though no cases reported with VAT). As with any new therapy, begin with supervised sessions if possible (e.g. in a clinic) for those with health concerns.

Research Gaps and Future Directions

Despite promising signals, **rigorous evidence is lacking** for VAT in menopause. Key gaps include:

- **Vasomotor Trials:** No placebo-controlled RCT has tested VAT for hot flashes or night sweats specifically. Given the physiological rationale, an urgent research question is whether VAT reduces hot flash frequency/intensity or improves thermoregulation (core temperature, skin blood flow).

- **Long-term Outcomes:** Most studies are short-term (weeks to months). We need longer trials (>6 months) to see if benefits sustain (especially for bone density and chronic insomnia) and if any delayed effects or adverse events emerge.

- **Dose Optimization:** There is no consensus on optimal vibration frequency, amplitude, session duration or total course length. Systematic dose-finding studies are needed (e.g. compare 10 vs 30 min sessions, different Hertz levels) to identify the "sweet spot" for each symptom domain.

- **Mechanistic Studies:** The proposed neural/endocrine pathways are largely hypothetical. Studies measuring hormone levels (cortisol, melatonin, growth hormone), sympathetic markers (catecholamines), EEG changes, and brain imaging in menopausal women before/after VAT could clarify how it works.

- **Combination Therapies:** It is unknown whether VAT adds to or interacts with other treatments (e.g. HT, SSRIs, exercise). Trials that add VAT to standard care (e.g. SSRI + VAT vs SSRI alone) could quantify incremental benefit.

Priority Research Questions: (1) *Can VAT significantly reduce hot flash frequency or severity in menopausal women?* (2) *Does regular VAT improve bone mineral density or muscle function vs exercise alone?* (3) *What autonomic/hormonal changes accompany symptomatic improvements from VAT?*

Proposed Study Design

As a concrete step, we propose a randomized, sham-controlled trial of VAT in symptomatic menopausal women.

- **Population:** 120 women aged 45–60, ≥6 months amenorrhea, with ≥5 moderate-to-severe hot flashes/day. Exclude those on HT, and those with contraindications.
- **Arms:** (A) Active VAT (e.g. 30-min sessions, 3×/wk) for 12 weeks; (B) Sham control (identical mat but no vibrations, plus neutral audio). Both groups receive standard advice on cooling and sleep hygiene.
- **Outcomes:** Primary: change in weekly hot flash index (frequency×severity diary). Secondary: Insomnia Severity Index, Menopause-Specific Quality of Life (MENQOL) scores, Beck Depression Inventory, Bone turnover markers (CTX, P1NP) at baseline and 3 mo, and lumbar/hip BMD (DXA) at baseline and 6 mo. Also measure autonomic tone (24h HRV) and sleep actigraphy in a subset.
- **Sample Size:** To detect a moderate effect size (d≈0.5) on hot flash reduction with 80% power, ~60 subjects per arm are needed (total ~120). This allows for ~20% dropout.
- **Duration:** 12-week intervention with 3-month follow-up. (Longer follow-up for BMD would be ideal, but even 6 months could show bone marker trends.)
- **Analysis:** Intent-to-treat. Compare hot flash scores and secondary outcomes between groups, adjusting for baseline covariates.

This design would yield robust data on efficacy and mechanisms. If positive, it could justify larger trials or inclusion of VAT in menopause guidelines.

References

- Skille's original definition: Olav Skille invented *"direct transmission of sound frequencies (30–120 Hz) through loudspeakers and transducers, transferred directly to the whole human body."* [1] He noted that VAT "gives the whole body a massage" via vibrations traveling through the body's ~70% water content [8].
- TheSoundWell's products: They supply vibroacoustic recliners, mats, pillows and "sonic pets" that infuse harmonic low-frequency sound into the body [2]. A Vibro-Mat, for example, has 6 transducers and preloaded 7-frequency programs by Skille [14]. TheSoundWell notes these frequencies require special training and doctor consultation if illness is present [9].
- Bone density evidence: Whole-body vibration (WBV) trials show small but significant BMD gains. Lai *et al.* found lumbar spine BMD +2.0% (p=0.047) with 30 Hz, 5-min WBV 3×/wk versus –0.05% in controls [3]. Gusi *et al.* found femoral neck BMD +4.3% (p=0.011) in a WBV group vs 0.0% in walking controls [4]. Mechanistically, *"pressure induces bone formation according to the piezoelectric theory"*, and WBV can boost growth hormone/testosterone [19].
- Insomnia: In a randomized trial (N=30), one month of vibroacoustic stimulation (sound + vibration) significantly improved objectively-measured sleep and insomnia severity [5]. This was accompanied by changes in brain connectivity (cerebellum, thalamus, etc.) on fMRI, suggesting deep neural effects of VAT.
- Mood/Stress: A 66-subject RCT in depressed patients found that 4 weeks of "somatosensory music" (VAT) led to greater reductions in depression scores (HAMD) and stress, and larger increases in positive emotion and heart-rate variability, compared to controls [6]. Kantor *et al.* (2022) showed a

single 20-min VAT session significantly ↑ HRV versus sham [7]. These studies confirm VAT's effect on autonomic balance and mood.

- Preliminary menopause symptoms: A Norwegian clinical report of 24 women undergoing 10 VAT sessions noted that 8 women "got rid of" one or more menopausal complaints (hot flashes, insomnia, mood swings, decreased libido, etc.) [22]. Although uncontrolled, this suggests VAT may help multi-faceted menopausal issues.
- Contraindications and safety: TheSoundWell's disclaimer emphasizes that **"any product described on this website is not intended to diagnose, treat or prevent any disease"**, and that users with health conditions should have *"medical doctor confirmation to use our equipment"* [9]. In practice, avoid VAT if pregnancy, active medical illness or implants. No serious adverse events from VAT have been reported in the literature.
- Nonhormonal comparisons: Evidence-based non-drug options for vasomotor symptoms include SSRIs/SNRIs (effective in ~50% of patients, but can cause sexual side effects), gabapentin, clonidine, and CBT/hypnosis [12]. CBT and clinical hypnosis have been shown to reduce hot flash bother and improve mood/sleep [12]. Phytoestrogens and supplements (soy, black cohosh) lack convincing evidence [13]. VAT, with its relaxation and neuromodulatory effects, is conceptually analogous to these mind-body therapies.

Sources: Official materials from TheSoundWell/Multivib [2] [1]; peer-reviewed studies of vibroacoustic or vibration therapy [3] [4] [5] [6] [7] [24]; authoritative reviews on menopause management [12] [13].

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