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# Research Advances in the Treatment of Urinary System Diseases with "Zhibian"(BL54)-toward-"Shuidao" (ST28)

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Abstract: The needling technique of directionally penetrating from "Zhibian" (BL54)-toward-"Shuidao" (ST28) is a characteristic long-needle deep-penetration method in Traditional Chinese Medicine (TCM), originating from "Huangdi Neijing" (Yellow Emperor's Inner Canon). It demonstrates significant efficacy and broad application potential in treating genitourinary disorders. This paper systematically reviews the technique's historical origins, anatomical foundations, and standardized protocols. Clinical evidence supporting its therapeutic advantages—such as bidirectional bladder function modulation, alleviation of prostatic diseases, and management of stress urinary incontinence—is critically analyzed. Mechanistically, the role of apoptotic factor regulation and neuroendocrine network modulation is explored. Current research has established a standardized technical framework. Future studies should expand evidence-based investigations into its application for perimenopausal syndrome and ovarian hyporesponse.

Keywords: Zhibian (BL54)-toward-Shuidao (ST28), Acupuncture, Research advances.

#### 1. Introduction

The "Zhibian" (BL54)-toward-"Shuidao" (ST28) is a long-needle directional deep penetration method rooted in the classic theories of traditional Chinese medicine, with its theoretical origins traceable to the "Huangdi Neijing" [1]. This technique boasts profound historical depth and a clear academic lineage. It exhibits unique advantages in treating urogenital system diseases, with indications encompassing: prostate disorders such as benign prostatic hyperplasia, chronic non-bacterial prostatitis, and prostatodynia; bladder dysfunction characterized by bidirectional regulation of bladder contraction and relaxation, effectively addressing urinary incontinence, neurogenic stress urinary incontinence/retention, and enuresis; reproductive system conditions including male oligoasthenospermia, erectile dysfunction, female premature ovarian insufficiency, endometriosis, and primary dysmenorrhea. Clinical evidence demonstrates that this technique possesses multi-target regulatory properties, offering a safe and effective non-pharmacological intervention for urogenital system disorders.

### 2. Historical Origins and Evolution

The application of the cháng zhēn (long needle) in deep needling techniques originates from classical texts such as the Lingshu (Miraculous Pivot, c. 1st century BCE). In its chapter "Jiǔ Zhēn Shí'èr Yuán" (Nine Needles and Twelve Source Points), the instrument is described as "seven cun in length (approx. 16.1 cm, Han Dynasty standard), with a sharp tip and slender body, capable of treating yuǎn bì (obstinate bi-syndromes in deep tissues)" – a formulation that established foundational principles for penetrating needling methodologies. This therapeutic rationale is reinforced in the chapter "Guān Zhēn" (Official Needles), which prescribes the long needle for pathologies localized in the zhōng (interior anatomical layers). Clinical specifications appear in "Diān Kuáng" (Madness and Manic Disorders), where its use is

directed at "puncturing the Foot Shaoyin Kidney Meridian, Foot Taiyang Bladder Meridian, and di shang (sacral region)" to resolve nèi bì bùdé sou (internal obstruction manifesting as urinary retention). While the text identifies the sacrum as a strategic intervention site, it omits explicit acupoint nomenclature. Subsequent interpretations have sparked scholarly debates. Ming physician Zhang Jiebin (1563–1640) posited in Leijing (Classified Canon) that "dĭ shàng" refers to Chángqiáng (GV1/DU1), an acupoint on the Governor Vessel distal to the coccyx. Contrarily, modern research led by Yang Zhaogang [2] substantiates Zhibiān (BL54) - a Bladder Meridian point requiring 8-12 cm insertions - as the empirically validated locus for urogenital dysfunction, aligning textual analysis with contemporary clinical practice. The Shuidao acupoint (ST28) was first documented in A-B Classic of Acupuncture and Moxibustion (Zhenjiu Jia-Yi Jing), a foundational text compiled by Huangfu Mi (215-282 CE). The original description states: In 1994, Professor Yang Zhaogang introduced a novel needling technique in Chinese Practical Mang Needle Therapy, proposing that a deep penetration method from Zhibian (BL54) to Shuidao (ST28) could effectively treat urogenital disorders, including enuresis, erectile dysfunction, prostatitis, and benign prostatic hyperplasia. Since the 1990s, Professor Ji Láixí has spearheaded extensive clinical and experimental research on this Zhibian-to-Shuidao technique. His studies revealed that when the needle body forms a 20° angle with the trunk's sagittal plane, its exit point aligns precisely with the anatomical coordinates of Shuidao - located 2 cun lateral to the midline and 2 cun superior to the pubic symphysis [3].

### 3. Anatomical Basis

The Zhibian acupoint (BL54) is anatomically located on the gluteal region, 3 cun lateral to the sacral midline at the level of the fourth sacral posterior foramen. The Shuidao acupoint (ST28) is positioned 2 cun superior to the pubic symphysis and 2 cun lateral to the midline. Clinical observations demonstrate that during the needling procedure through these

acupoints, the needle sequentially traverses the following anatomical structures: the integumentary layer, superficial fascia, gluteus maximus muscle, piriformis muscle, sciatic nerve (a branch of the sacral plexus), greater sciatic foramen, and pelvic plexus. In some cases, the needle additionally passes through the interstitial spaces between the internal iliac vessels and their branches before continuing its deep penetration into the abdominal wall, ultimately terminating near the anatomical location of the Shuidao acupoint [4]. In the vicinity of the needle insertion point, the superficial fascia houses the second and third branches of the superior gluteal cutaneous nerve as well as the middle gluteal cutaneous nerve. As the needle traverses the piriformis muscle, it is anatomically positioned near the sciatic nerve, superior gluteal nerve, inferior gluteal nerve, posterior femoral cutaneous nerve, and pudendal nerve. Upon entering the pelvic cavity, the needle is strategically located adjacent to the sacral plexus, obturator nerve, and pelvic plexus. During the "Zhibian Penetrating Waterway" technique, after passing through the gluteus maximus, the needle aligns centrally with the piriformis muscle, proceeding along the medial margin of the sciatic nerve and in proximity to the pudendal nerve before entering the greater sciatic foramen. It subsequently penetrates the sacral plexus and reaches the extraperitoneal region of the lateral pelvic wall. When patients report sensations such as heat, distension, or relaxation within the pelvic cavity, the needle tip has precisely reached the anteroinferior portion of the pelvic plexus. This needling technique progresses systematically from superficial to deep layers while meticulously avoiding damage to nearby critical structures, including the inferior gluteal artery/vein, external iliac artery/vein, and bladder [5].

### 4. Standardized Operations

The Zhibian (BL54)-toward-Shuidao (ST28) requires the patient to assume a lateral decubitus position. A 30-gauge filiform needle is employed to penetrate from the Zhibian acupoint (BL54) toward the ipsilateral Shuidao acupoint (ST28), with an insertion depth of 167-200 mm. The needle is inserted at a 20° angle relative to the sagittal plane, eliciting needle sensations that radiate toward the perineum and lower abdomen. A lifting-thrusting manipulation technique is applied for 1 minute, followed by immediate needle withdrawal without retention. The Zhibian acupoint (BL54) is anatomically defined as 100 mm lateral to the spinous process of the fourth sacral vertebra, while the Shuidao acupoint (ST28) is localized 100 mm inferior to the umbilicus and 67 mm lateral to the anterior midline. Consistent with foundational acupuncture-moxibustion theory, this technique exerts therapeutic effects on localized pathologies through precise neuromodulatory stimulation. The slow-insertion methodology safeguards internal viscera while inducing characteristic sensations of warmth, distension, dissipative relaxation, and propagated qi in patients. These sensations transmit along the Bladder and Stomach Meridians, correlating with the proximity of the bladder, kidneys, uterus, and spermatic vesicles within the treatment field. Consequently, the technique demonstrates efficacy in managing renal disorders, select gynecopathies, and defined urogenital pathologies [6].

## 5. Clinical Research

The "Zhibian Toushuidao" acupuncture technique elicits distinct sensations of warmth, rapidity, distension, and relaxation within the pelvic cavity of patients, while ensuring no adverse effects on adjacent critical blood vessels, nerves, or organs. The study conducted by Zhu Jun et al. [7] demonstrates that the water pathway needling technique applied at the Zhibian acupoint (BL54) effectively clinical manifestations in patients with ameliorates neurogenic bladder dysfunction. This therapeutic intervention not only enhances local hemodynamics but also significantly suppresses detrusor muscle hyperactivity, while substantially restoring functional coordination between the bladder detrusor and the external urethral sphincter. Wang Haijun et al. [8] hypothesize that the water pathway needling technique administered at the Zhibian acupoint (BL54) may regulate bladder qi activity and potentially modulate both primary and higher micturition control centers through neural feedback mechanisms. Du Mengxuan et al. [9] hypothesize that the water pathway needling technique administered at the Zhibian acupoint (BL54) elicits distinct propagated needle sensations in patients, extending to the urethral region. This therapeutic modality functions to activate mental alertness and facilitate qi circulation, consequently inducing potent detrusor muscle contractions. Concurrently, Fang Sheng et al. [10] postulate that Zhibian-based water pathway acupuncture modulates complexes sphincteric-urethral and pelvic floor musculoligamentous structures through pelvic plexus neurostimulation, thereby optimizing vesical urine containment capabilities. Qiu Yu et al. [11] posit that the Zhibian-Toushuidao needling technique, administered at the Zhibian acupoint (BL54 according to WHO Standard Acupuncture Nomenclature), exhibits significant therapeutic efficacy in managing urogenital system pathologies. When combined synergistically with Fire Dragon Moxibustion (Huolong Jiu), this modality enhances meridianal qi circulation, promotes thermal regulation and channel declogging, reinforces the primordial essence (Zhenyuan), augments immunomodulatory functions, and facilitates pathogenic factor elimination. Clinical evidence demonstrates this integrated approach effectively mitigates neurogenic bladder dysfunction secondary to acute myelitis, offering a viable complementary strategy within contemporary neuromodulation therapies. The study conducted by Zhao Min et al. [12] demonstrated that the combined therapy of elongated filiform needle manipulation at Zhibian (BL54) through Shuidao (ST28) with salt-partitioned moxibustion at Shenque (CV8) exhibits superior efficacy in enhancing maximal bladder capacity, reducing residual urine volume, and lowering OABSS scores compared to conventional acupuncture protocols. Notably, this integrative approach markedly improved therapeutic outcomes in post-stroke urinary incontinence management, as evidenced by statistically significant OABSS score attenuation. These findings suggest the intervention's capacity to mitigate detrusor hyperactivity symptoms through suppression of involuntary detrusor contractions. Collectively, these mechanisms substantiate the technique's efficacy in ameliorating urinary incontinence symptoms. Notably, clinical applications demonstrate differential therapeutic

effects: pathogen expulsion in post-stroke excess-pattern incontinence and gradual reinforcement in deficiency-pattern manifestations, thereby manifesting bidirectional regulatory properties across yin/yang obstructive subtypes of urinary incontinence. The clinical application of Zhibian-Toushuidao needling technique necessitates synergistic integration with thermal regulatory therapies, including Fire Dragon Moxibustion (Huolong Jiu), moxa cone moxibustion (Ai Zhu Jiu), and warm needle moxibustion (Wen Zhen Jiu). These modalities demonstrate triple therapeutic actions: redirecting ministerial fire (Xianghuo) to its physiological origin, warming renal yang to enhance qi synthesis, and stabilizing vital gate fire (Mingmen Huo), thereby effectively regulating the pathogenesis of deficiency-induced fire effulgence (Xu Huo Shang Yan) through comprehensive metabolic modulation.

## 6. Animal Experimentation Research

In addition, current studies have demonstrated that the "Zhibian Toushuidao" acupuncture technique exhibits unique advantages in protecting ovarian function and repairing endometrial tissue through multiple mechanisms. These include dual regulation of apoptosis/autophagy pathways (Bcl-2/Bax/LC3), restoration of mitochondrial function, and reconstruction of the hypothalamic-pituitary-ovarian (HPO) neuroendocrine network. The study led by Hao Jianheng revealed that "Zhibian Toushuidao" acupuncture significantly enhances reproductive functionality in murine models of asthenospermia, with mechanistic implications involving coordinated modulation of pivotal mediators in both death receptor-dependent and mitochondrial apoptotic pathways [13]. Experimental evidence suggests this therapeutic intervention ameliorates cyclophosphamide-induced testicular histopathological alterations in asthenospermia mice, conferring improved reproductive outcomes through mitochondrial apoptotic pathway suppression [14]. Through downregulating ovarian granulosa cell apoptosis in poor ovarian response (POR) models, "Zhibian Toushuidao" acupuncture demonstrates ovarian functional restoration. Mechanistic investigations implicate its capacity to orchestrate critical nodal proteins within the PI3K/AKT/FOXO3a signaling axis. Furthermore, this technique rectifies dysregulated serum sex hormone profiles, attenuates ovarian somatic cell apoptosis, and facilitates folliculogenesis/ovulation via PI3K/AKT/FOXO3a-mediated inhibition of apoptotic signal propagation [15]. Multidimensional therapeutic effects of "Zhibian Toushuidao" encompass acupuncture spermatogenic parameter optimization - including sex hormone homeostasis restoration, sperm kinematic enhancement, elevated conception rates, and embryonic yield – potentially attributable to its bidirectional regulatory action on testicular Caspase-3 cascades, effectively curtailing germ cell apoptosis through integrated extra-intracellular signaling modulation [16]. The "Zhibian-Toushuidao" penetrating needling technique (GB30→GB28) developed by Dr. Yan Jing demonstrated significant therapeutic effects in premature ovarian insufficiency (POI) rat models. This acupuncture protocol effectively normalized the dysregulated hypothalamicpituitary-ovarian (HPO) axis by promoting Bcl-2 anti-apoptotic protein expression while suppressing pro-apoptotic Bax protein levels, resulting in attenuated

granulosa cell apoptosis dynamics and decelerated follicular atresia progression. These molecular adaptations collectively reversed ovarian functional deterioration, exhibiting superior therapeutic outcomes compared to standard acupoint protocols [17]. Mechanistically, this technique regulates endocrine homeostasis through multi-target interventions: (a) restoring serum sex hormone balance in POI subjects; (b) enhancing ovarian reserve capacity via suppression of Fas/FADD/Caspase-8 cascade activation in the death receptor pathway; and (c) sustaining granulosa cell viability through Bcl-2/Bax apoptosis modulation [18]. Ma Wenjuan et al. demonstrated that the "Zhibian-Toushuidao" penetrating acupuncture technique exhibits superior therapeutic efficacy endometriosis patients, effectively alleviating in dysmenorrhea, modulating sex hormone profiles, and regulating EMAb and CA125 levels while improving hemodynamic parameters. The observed effects may involve coordinated upregulation of miR-141-3p and miR-17-5p expression alongside suppression of miR-145 [19]. Jin Xu et al. proposed that the analgesic action of "Zhibian-Toushuidao" acupuncture in PD rats is mediated through inhibition of pathway NOD1/RIP2/NF-ĸB signaling activation. consequently attenuating uterine inflammatory responses [20]. Ma Mengna et al. revealed that the "Zhibian-Toushuidao" technique enhances ovarian function in POI rats via dual regulation of Bcl-2 upregulation and Bax downregulation in ovarian tissue. This mechanism reduces granulosa cell apoptosis, increases AMH and INHB secretion, and promotes follicular development. Collectively, these actions improve ovarian function by mitigating follicular atresia and enhancing reproductive hormone levels [21]. Chang Boya et al. identified Notch signaling pathway modulation as a potential mechanism through which "Zhibian-Toushuidao" acupuncture improves ovarian responsiveness and function in POR mice [22].

"Zhibian" (BL54)-toward-"Shuidao" (ST28), The specialized method derived from the Yellow Emperor's Inner Canon, demonstrates significant therapeutic value and multi-targeted regulatory effects in managing urogenital disorders. Rooted in precise anatomical landmarks (GB30->GB28) and standardized protocols, this technique exhibits three principal therapeutic dimensions: (1) bidirectional modulation of bladder dysfunction, (2) effective management of prostatic pathologies, and (3) notable improvement in stress urinary incontinence. Mechanistic investigations have identified its regulatory effects on apoptosis mediators (Bcl-2/Bax ratio modification), neuroendocrine homeostasis, and critical signaling cascades including PI3K/AKT/FOXO3a and Notch pathways. While guidelines established technical facilitate clinical implementation. further research should prioritize evidence-based validation in perimenopausal disorders and ovarian hyporesponsiveness, particularly regarding epigenetic regulation and neural-immune crosstalk. This ancient technique not only offers a non-pharmacological paradigm for urogenital healthcare but also advances the scientific substantiation of TCM through mechanistic elucidation.

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