Meridian Master Class: The Bladder Meridian

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Abstract

This article describes the path and anatomy of the Bladder meridian. It explores points commonly used by Physiotherapists, unravelling the rationale behind their indications from both a Western and traditional Chinese perspective. The concept of back-shu points is analysed and key safety considerations are highlighted. This masterclass draws on current research to highlight parallels between Western medical and traditional Chinese philosophies.

Key words: Bladder meridian, traditional Chinese medicine, back-shu

Introduction

The Bladder channel is the longest meridian in the body, with a total of 67 points. It commences by the inner canthus of the eye, ascending up and over the top of the head descending down the dorsal surface of the trunk and lower limb, terminating on the outer border of the little toe (See Figure 1). The Bladder meridian is frequently used by Physiotherapists in the treatment of headaches, spinal pain and lower limb disorders due to its route though the paraspinal and posterior lower limb musculature. Points on the Bladder meridian however are not only useful from a musculoskeletal perspective but can be used for a range of ailments from eye disorders to turning breach babies (Deadman *et al* 2007). This paper will give an overview of the Bladder meridian and its key points from both a Western and traditional Chinese medicine (TCM) perspective, drawing on current literature to explore the links between these two philosophies.

Insert Figure 1 here please

From a Western perspective the bladder is simply a reservoir for storing and excreting urine. However in TCM, the Bladder is not only responsible for collecting and excreting urine, but also for its production (Kaptchuk 2000). The Bladder is said to receive fluids from the Small Intestine and transform these into urine using yang qi from the Kidney (Maciocia 2005). In TCM the function of each yang organ is inextricably linked to those of its yin partner; in this instance the Kidney. The Kidney is commonly regarded as the most important organ in the body; governing birth, growth, reproduction and ageing. It is responsible for storing our jing or “essence” which is the driving force behind the function of all other organs and essential for life itself (Maciocia 2005).

Understanding the relationships between organs and meridians from a TCM perspective can help explain some point indications, which can initially appear obscure. In TCM each of the twelve main meridians are arranged in paired layers, known collectively as the six chaos. These layers vary in depth and can be thought of as the body’s protective mechanism (Hopwood 2004). The Bladder meridian along with the Small Intestine, comprise the most external layer known as Tai Yang. This

superficial layer of defense is the most susceptible to external pathogens, particularly wind, which may manifest as a fever, chills or aching along the channel (Pirog 1996). From a western perspective this may be synonymous with the initial stages of a cold or the flu. It is also interesting to note that the spine is the most common site for musculoskeletal pain, which is perfectly logical from a six chao perspective. BL62 is considered to be a particularly useful point for expelling wind and dispersing pain along the Bladder channel, especially when combined with SI3 (Pirog 1996).

Researchers have long sought proof of the existence of meridians from a Western perspective. However meridians do not consistently follow blood or lymph vessels or peripheral nerves. Recent theories have focused on exploring the similarities between meridians and connective tissue planes. The Bladder meridian closely follows the Superficial Back Line of fascia as detailed by Myers (2014). Myer's dissections detail points or stations along this line of fascia where connective tissue binds to bone. Pearce (2013) has drawn parallels with these binding sites and key acupuncture points, suggesting needling these could have therapeutic benefits both locally and distally along the connective plane. Myer's theory of 'stations' could help explain some of the traditional Bladder channel point indications. For example BL 39 just medial to biceps femoris in the in the popliteal fossa is also a fascial binding site. In TCM, BL39 is indicated for tightness in the lower limb and difficulty bending the lumbar spine (Deadman *et al* 2007). Needling here may not only improve movement by segmentally altering any pain, but may also have mechanical effects on the fascial plane as a whole.

Key Points

Bladder 2: Zanzhu "Gathered Bamboo"

BL2 is located at the medial end of the eyebrow, just above the inner canthus of the eye. It is indicated for a range of eye disorders, headaches and hayfever (Deadman *et al* 2007). Anatomically BL 2 is situated in the frontalis muscle, which is frequently implicated in tension headaches and may explain its frequent use in such treatment protocols. Research has shown that acupuncture is more effective than artificial tears in the treatment of dry eyes (Lee *et al* 2011); BL2 was an integral part of many of the trials included in this systematic review, in combination with other local points such as ST2 and GB14. The authors hypothesise that acupuncture may stimulate the lacrimal glands, however this has yet to be proven.

Bladder 10: Tianzhu "Celestial Pillar"

BL10 is located 1.3 cun lateral to the upper border of the spinous process of C2. Segmentally BL10 is innervated by C1-5 and passes through the trapezius, semispinalis and oblique inferior muscles, making it an invaluable point in the treatment of neck pain. When teaching on CPD courses the author has noted this point is commonly needled incorrectly with many practitioners needling lower than recommended, often citing fears of needling the vertebral artery or spinal cord. It is estimated that at BL10, depths of 5-6cm would be required to hit the spinal cord (if angled medially) and a similar distance angled laterally to reach the vertebral artery

(Peuker and Cummings 2003a). If needled perpendicularly to a depth of 0.5-0.8 cun this point is very safe (see Figure 2.).

Insert Figure 2. here please

Bladder 11: Dazhu "Great Shuttle"

Situated 1.5 cun laterally to the base of the spinous process of T1, BL11 is the influential point for bone and as such is indicated in the treatment of any bony pathology, particularly painful bony obstruction, synonymous in western medicine with arthritic disorders. There is a lack of empirical evidence looking specifically at the effects on this point on bony pain or the mechanisms behind this, although it is included in some O.A study protocols (Hinman *et al* 2012). From an anatomical perspective several important muscles attach locally including trapezius, splenius captitus and cervicis. There are also sympathetic links to the head and neck and connections to the trigeminocervical nucleus, an area often sensitized in migraine (Goadsby 2005); making this a useful point in the treatment of headaches and neck pain.

Bladder 12: Fengmen "Wind Gate"

Located 1.5 lateral to the base of the spinous process of T2, Fengmen is a key point for expelling pathogens especially wind, which this channel is particularly susceptible to. From a western perspective 'wind' in the Bladder meridian may be interpreted as a virus such as a common cold and the achiness in the head or neck that can accompany this. BL12 is often combined with BL13, the back-shu point for the lung, when trying to treat such ailments. Research into patients with allergic asthma has shown that acupuncture at BL12, BL13 and GV14 may actually have immune boosting effects and is associated with increased levels of t-lymphocytes (Yang *et al* 2013).

Back-Shu Points

According to TCM theory, each organ has a corresponding back-shu point; these lie along the inner bladder line 1.5 cun from the base of the corresponding spinous processes (See Table 1.). 'Shu' translates as 'to transport' and implies that the qi of a particular organ can be moved between the organ itself and the corresponding back-shu point (Deadman *et al* 2007). For example BL13, the back shu for the lung may be used to treat asthma or chest infections. Some practitioners also use the back-shu points for diagnostic purposes, carefully observing and palpating the points looking for changes, which may imply signs of organ dysfunction. This is not dissimilar to the way in which western practitioners use visceral referred pain to aid diagnosis i.e. low back pain may be indicative of a kidney infection or acute right-sided mid-thoracic pain may indicate cholecystitis.

Insert Table 1. here please

So is there any evidence that back-shu points can influence organ function? Hsu *et al* (2006) found that 10 minutes of low frequency electroacupuncture (EA) at BL15

(back-shu for the heart) produced significant reductions in heart rate in healthy subjects. Animal studies have also shown that EA at BL21, (back-shu for the stomach), can produce significant increases in gastric motility (Wang *et al* 2013).

From a Western perspective the action of the back-shu may in part be explained by the sympathetic innervation of the organs. For example, sympathetic nerves originating from T2-5 control bronchodilation. Gentle needling has been shown to decrease sympathetic tone in the corresponding spinal segment (Haker *et al* 2000) and could therefore explain how BL13 (the back shu for the lung, level with T2) may be useful in the treatment of asthma.

Unfortunately not all the back-shu points correspond neatly with their western sympathetic innervations (see Table 1). Clinicians wishing to influence sympathetic tone may wish to use a more western clinical reasoning model for point selection, choosing bladder points which correspond to the known sympathetic innervation rather than the traditional back-shu point locations.

The neurophysiological mechanism for changes in visceral activity following acupuncture is likely to be more complex than simple segmental modulation of autonomic nerves. Research suggests these changes may also involve autonomic regulatory systems in the brainstem and hypothalamus (Li *et al* 2013). Keown (2014) has also theorised that the connections between organs and their back-shu points may in part be explained by their shared embryological origins.

Safety is a critical consideration when needling the thoracic back-shu points. Although the lungs, pleura and spinal cord could all potentially be pierced from this location, ensuring points are needled medially towards the spine and at a maximum depth of 0.5-1 cun (depending on patient build) should ensure needles remain in the paraspinal musculature. It is estimated that the spinal cord lies between 2.5 and 4.5cm from the surface of the skin along the inner bladder line (Peuker and Cummings 2003b). Greater care is required when needling points along the outer bladder line, where the parietal pleura may be as superficial as 1.5 cm (Peuker and Cummings 2003b). These points should be needled transversely, medially at a depth of 0.3-0.5 cun (see Figure 3). There can be a temptation to needle laterally in the mid-thoracic region when trying to reach trigger points in the rhomboids, however this carries a substantial risk of pneumothorax and should be avoided (Karavis *et al* 2015).

Insert Figure 3 here please

Bladder 23: Shenshu "Kidney Shu"

BL23 located on the inner bladder line, level with the base of L2, is one of the most commonly used points for the treatment of low back pain. From a TCM perspective low back pain is commonly caused by deficient Kidney qi, and as the back-shu point of the Kidney, BL23 is a key point in treating this disorder. The Bladder relies on Kidney qi to function and if this is deficient normal urinary function can be affected. BL23 can therefore be used for a range of urinary problems, the effects of which may be partially explained by modulation of the sympathetic nerve supply to the bladder,

which originates from T11-L2. A recent systematic review into acupuncture for incontinence failed to demonstrate any significant difference between verum and sham needling, however the poor methodology quality of trials prevented firm conclusions from being drawn (Paik *et al* 2013). Acupuncture for overactive bladder however, was as effective as medication and had significantly less side effects. This trial combined BL23 with sacral points and ST36 and SP6, which are thought to boost Kidney qi in TCM (Kelleher *et al* 1994).

Bladder 35: Huiyang "Meeting of Yang"

Located 0.5 cun lateral to the tip of the coccyx the author has found this point invaluable in the treatment of coccydynia when combined with BL33 and 34; however there is an absence of clinical research in this area. Classically these points are also indicated in the treatment of hemorrhoids, although the efficacy of this has not been well researched.

Bladder 40: Weizhong "Middle of the Crook"

Located in the centre of the popliteal crease, BL40 is classified as one of Ma Dan-Yang's Heavenly Star points. This set of 12 points was named after a famous Jin dynasty acupuncturist, and were traditionally thought to be the most useful points in the body (Nugent-Head 2012). BL40 is particularly useful for lumbar spine and knee pain owing to its S1/2 segmental innervation and fascial connections. BL40 is the He-sea point of the Bladder channel. He-sea points are traditionally thought to be points were the qi of a meridian starts to flow more deeply and can be used to treat disorders of the corresponding organ, in this case the bladder (Deadman *et al* 2007). From a western perspective BL40 shares the same segmental innervation as the parasympathetic nerves to the bladder, which could explain the regulatory effects some authors have reported on bladder function in protocols including BL40 (Yuping *et al* 2006).

Practitioners should be aware of the proximity of the tibial nerve and popliteal artery, which can be reached at a depth of between 2-3cm (Peuker and Cummings 2003c). There have been documented cases of popliteal aneurisms being caused by acupuncture to BL40 (Kao and Chang 2002).

Bladder 60: Kunlun "Kunlun Mountains"

Located between the lateral malleolus and the posterior margin of the achilles tendon, BL60 is another of Ma Dang-Yang's heavenly star points. As the fire point on the Bladder channel it can be used to clear heat or excess from more proximal parts of the meridian and as such is useful for occipital headaches, back and leg pain and eye disorders (Deadman *et al* 2007). Kim *et al* (2013) found that acupuncture at BL60 activated specific areas of the brain concerned with vision, when compared to a sham control. Empirically this point is also thought to stimulate labour, alongside points such as SP6, BL32 and LI4 (Betts 2009). The efficacy of this however has yet to be proven (Smith 2008). BL60 is traditionally contradicted in pregnancy and the AACP advises against its use (AACP 2012). However it should

be noted that there is no Western evidence or anatomical rationale to suggest that this point is unsafe (Park *et al* 2014).

Bladder 67: Zhiyin "Reaching Yin"

Located in the lateral corner of the nail bed of the fifth toe, BL67 is famed for its purported ability to turn breech babies when treated with moxibustion. A recent Cochrane review failed to reach any firm conclusions over the efficacy of this treatment due to the considerable heterogeneity of studies and conflicting outcomes (Coyle et al 2012). The authors noted large variation in the frequently and length of moxibustion and the gestational age on commencement of treatment. A more recent sham controlled trial demonstrated a significant decrease in breech presentation at birth when using moxibustion daily for twenty minutes from week 32 (Vas et al 2013). The authors suggest success with this technique may be dependent on early intervention.

As the most distal point on the Bladder meridian, BL67 is indicated classically for treating acute disorders at the opposite end of the channel, in this case; headaches and eye disorders. Cho et al (1998) found that acupuncture needling at BL67 stimulated the visual cortex on fMRI, however this study was conducted on healthy volunteers and studies have yet to investigate the clinical effects of this point on symptomatic individuals.

Conclusion

The Bladder meridian contains many useful points that are frequently used by physiotherapists in the treatment spinal and lower limb disorders and headaches. However the use of Bladder meridian points should not be restricted to musculoskeletal pain. Back-shu points may have an important role to play in the management of significant co morbidities such as irritable bowel or bladder syndrome and asthma. More high quality research is required into the effects of Bladder points on eye pathologies and pregnancy and the mechanisms behind the physiological effects on disorders other than pain.

Biography

Rachel Kyte is a senior lecturer at the University of Worcester. She trained at Keele University and qualified as a Physiotherapist in 2000. Since graduating she has worked in various NHS and private settings in both the UK and abroad, specialising in the management of musculoskeletal disorders. Rachel completed her foundation acupuncture training in 2003. She was awarded an MSc in Acupuncture from Coventry University in 2009, and became an advanced member of the AACP. She is a fellow of the Higher Education Academy and an accredited tutor for the AACP.

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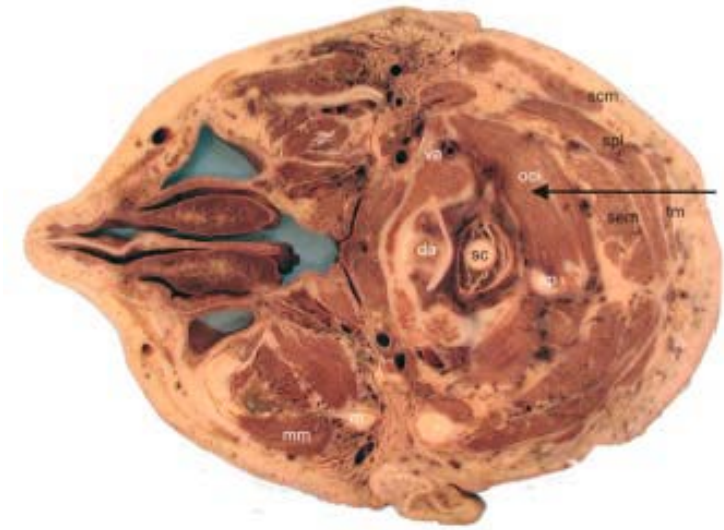
Images (permission required please)

Figure 1. The course of the Bladder meridian

Note - Please use the full picture of the Bladder meridian on pg 39 of the new AACP point manual. Permission required from Jon Hobbs.

Figure 2. Cross Section of the Head and Neck at C1

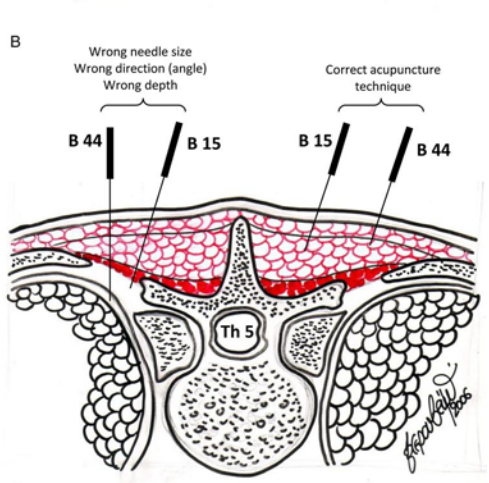
Note – Permission required from E. Peuker for picture and accompanying text. Image taken from: Peuker E. & Cummings M. (2003) Anatomy for the acupuncturist--facts & fiction. 1: The head and neck region. *Acupuncture in Medicine* **21(**1-2), 2–8. Available Online at: http://aim.bmj.com/content/21/1-2/2.long



This is a cross-section of the head and neck at the level of C1. Note the potential depth of needling at BL10, and the distance to the vertebral artery. Note that the vertebral artery runs more posteriorly above this level as it curves around the posterior aspect of the superior articular process of C1. Key to labels: da: dens axis; m: mandible; mm: masseter muscle; oci: oblique inferior muscle; scm: sternocleidomastoid muscle; sem: semispinalis muscle; spl: splenius muscle; sp: spinous process C2; tm: trapezius muscle; va: vertebral artery: arrow: possible needling depth at BL10. Image courtesy of Elmar Peuker.

Figure 3. Cross-sectional anatomy at T5

Note: Permission required please. Image taken from: Karavis M. Y., Argyra E., Segredos V., Yiallouroy A., Giokas G., & Theodosopoulos T. (2015) Acupuncture-induced haemothorax: a rare iatrogenic complication of acupuncture. *Acupuncture in Medicine*. [WWW document.] URL http://aim.bmj.com/content/early/2015/03/19/acupmed-2014-010700.full



Tables

Table 1.

Organ	Back-shu point	Spinal Level	Sympathetic Innervation
Lung	BL13	T3	T2-5
Pericardium	BL14	T4	T1-5
Heart	BL15	T5	T1-5
Liver	BL18	T9	T7-9
Gallbladder	BL19	T10	T7-9
Spleen	BL20	T11	N.A
Stomach	BL21	T12	T6-10
Sanjiao	BL22	L1	N.A
Kidney	BL23	L2	T5-9
Large Intestine	BL25	L4	T11-L2
Small Intestine	BL27	S1	T9-10
Bladder	BL28	S2	T11-L2