Enhancing your pulse diagnosis in Clinical Practice
PART 1: The Context

The Pulse is:

• Physiological phenomenon: propagated throughout the arterial system

• Any regular movement that manifests as a rise and fall of fluid in a vessel

• Clinically: an easily located, superficial artery, overlaying a firm structure
Pulse terminology and History

Nei Jing (300-100BCE)
- Pulse variations defined descriptively
- Metaphors
- Tactile imagery

Nan Jing (1st or 2nd century CE)
- Pulse variations defined descriptively
- Metaphors
- Tactile imagery

Mai Jing (200-300CE)
- 24 ‘collective group’ of descriptive terms identified
- Variations in parameters that together combine to form a discrete pulse
Problems with pulse terminology

- Ambiguous terms and hence definitions of pulse qualities
- The original pulse terminology has expanded over the centuries: authors have added their own interpretations
- The exact definition and context that the original author had intended the use of a pulse term isn’t clear
- This is compounded when authors don’t reference the sources from which they obtained the pulse terminology used Manaka (1994)
New and novel pulse systems appropriating part or whole of the pulse terminology adding new meanings that has no relevance to the original use of the term.

Multiple definitions for the one pulse type (sometimes conflicting).

Use of pulse names as descriptive terms.
<table>
<thead>
<tr>
<th>Author and source</th>
<th>Definition</th>
<th>Page no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deng (1999)</td>
<td>A replete pulse . . . arrives dynamically, it is hard and full, and its movement is large and long. With light touch it remains; with heavy pressure it has force. Its arrival and departure are both exuberant, and it can be perceived at all three levels</td>
<td>125</td>
</tr>
<tr>
<td>Guanzhou Chinese Medicine College (1991)</td>
<td>Felt at Cun, Guan and Chi forceful, long and large, on both light and heavy pressure</td>
<td>18</td>
</tr>
<tr>
<td>Li (Huynh, trans) (1981)</td>
<td>Sinking, firmer than the firm pulse, and has a strong beat</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>When a pulse is felt both superficially and deeply, and has big, long, wiry, strong beats</td>
<td>73</td>
</tr>
<tr>
<td>Kaptchuk T (2000)</td>
<td>Is big and also strong, pounding hard against the fingers at all three depths</td>
<td>199</td>
</tr>
<tr>
<td>Maciocia (2004)</td>
<td>The Full pulse feels hard, full and rather long; it is felt easily at all levels and it has a springy quality resistant to finger pressure’ Also notes the term as a description of a ‘broad range of full pulses . . .’</td>
<td>475</td>
</tr>
<tr>
<td>Porkert (1995)</td>
<td>Strong pulse manifesting on at least two levels. Still, the pulse shows its greatest strength and deployment on one particular level, ‘its specific level’</td>
<td>38</td>
</tr>
<tr>
<td>Wiseman &amp; Ellis (1996)</td>
<td>Similar to the forceful except it is forceful on both rising and falling</td>
<td>120</td>
</tr>
</tbody>
</table>

Table 4.2, p. 35, Walsh and King, 2008
<table>
<thead>
<tr>
<th>Author and source</th>
<th>Skipping pulse (Cù mài)</th>
<th>Rough pulse (Sè mài)</th>
<th>Stirred pulse (Dòng mài)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deng (1999)</td>
<td>Skipping</td>
<td>Rough</td>
<td>Stirred</td>
</tr>
<tr>
<td>Flaws (1997)</td>
<td>Skipping, rapidly, irregularly interrupted</td>
<td>Choppy</td>
<td>Stirring</td>
</tr>
<tr>
<td>Kaptchuk (2000)</td>
<td>Hurried</td>
<td>Choppy</td>
<td>Spinning Bean</td>
</tr>
<tr>
<td>Li (Huynh, trans) (1981)</td>
<td>Hasty</td>
<td>Choppy</td>
<td>Moving</td>
</tr>
<tr>
<td>Lu (1996)</td>
<td>Running</td>
<td>Choppy</td>
<td>Tremulous</td>
</tr>
<tr>
<td>Porkert (1995)</td>
<td>Agitated</td>
<td>Grating</td>
<td>Mobile</td>
</tr>
<tr>
<td>Morant (1994)</td>
<td>Accelerated</td>
<td>Hesitant Astringent</td>
<td>Turbulent</td>
</tr>
<tr>
<td>Wiseman &amp; Ellis (1996)</td>
<td>Skipping Interrupted</td>
<td>Rough</td>
<td>Uneven</td>
</tr>
</tbody>
</table>

Table 4.1, p. 35, Walsh and King, 2008
Unschuld notes...

‘The reasons for the great degree of conceptual confusion and for the absence of a stringent, technical terminology…are to be seen in the fact that at no time in the first or second millennium did more recent conceptual insights replace older views for good…(it) was merely adding to the existing range of meanings.’

(p. 283, Nan Jing, 1986).
Pulse parameters

- Rate
- Rhythm
- Depth
- Length
- Width
- Pulse occlusion
- Arterial tension
- Force
- Pulse contour and flow wave
PART 2: The physiology

The Pulse is:

• Physiological phenomenon:
  +

• Any regular movement

= Clinically: an easily located, superficial artery, overlaying a firm structure
The pulse is a composite of at least two different waves:

– Pressure Waves
– Flow waves
Pressure Waves

Systole: Heart contraction
Diastole: Heart relaxation
Flow Waves

- Longitudinal movement of blood
- Relative slow moving
  - the pressure wave always proceeds the flow wave
- Flow wave depends upon
  - blood volume
  - blood viscosity
The inter-relationship between pressure and flow is summarised within the TCM axiom:

Qi leads the Blood and Blood nourishes the Qi
‘Secret’ of pulse diagnosis is:

Pulse diagnosis is more than simply the assessment of the pulse - it also involves assessment of the arterial structure.
PART 3: Parameters and their Application to Clinic

- Rate
- Rhythm
- Arterial width
- Depth
- Length
- Arterial tension
- Ease of occlusion
- Force
- Pulse contour
The normal pulse is:

- A template used to make judgments on whether the pulse (and related parameters) deviate from an expected (and accepted) ‘healthy’ presentation

- Not a single value but rather a range of values. (For example, pulse rate)

- The ‘normal’ presentation of one pulse parameter does not necessarily exclude the potential that another is simultaneously presenting abnormally
Four aspects

1. Timing of the pulse:
   – Rate
   – Rhythm

2. Presence of the pulse:
   – Depth
   – Length

3. Arterial structure:
   – Width
   – Arterial tension
   – Occlusion

4. Pulse waveform:
   – Force
   – Contour and flow wave
Level of Pulse Depth

Pulse Depth is defined as the level of depth at which the pulse can be felt the **strongest**

Depth is determined by a person’s health. A person’s state of health thereby determines the:
- Surrounding tissue and its ‘condition’
- Underlying support (bone, tendon) to achieve pressure equilibrium
Levels of depth can vary from two to eight. The most common number of pulse depths in the literature are the:

**Two levels of depth**

- Zangfu pulse diagnosis; OR
- Five phase pulse diagnosis
  - Spleen deficiency (vacuity)
  - Liver excess (replete)

**Three levels of depth**

- Cun Kou system; OR
- Overall pulse qualities:
  - Wiry or String-like pulse
  - Slippery pulse
  - Floating pulse

Superficial = Fu (hollow) or Yang organs and channels
(Middle = Balance between Yin and Yang with the associated phase)
Deep = Zang (solid) or Yin organs and channels

Superficial = Expression of Yang and it’s ability to move outwards
Middle = reflects the interaction of Qi and Blood (Function and Form)
Deep = Integrity of Yin and it’s ability to anchor Yang
Walsh & King 5.6
Arterial width

Relative width

- Fluid fills the vessel (in which the RBC float).
- Changes to fluid (90% decreased) result in changes to width

Walsh & King 6.9
Arterial Tension and Ease of Occlusion

Two pulse parameters are useful for making assessments of the overall ‘function/quality’ of Qi and Blood

- Arterial tension
- Ease of occlusion
- (Qi/Blood balance diagnostic system)
Arterial tension

Arterial tension: resistance of the artery to finger pressure

- Yang Qi
- Relationship with Blood and fluids
- Emotions (stress + ‘flight, fright or fight’)

Referenced from: Figure 6.5, p. 93, Walsh and King, 2008
Pulse Diagnosis: A Clinical Guide
Pulse occlusion

Degree of ease, or not, in occluding the flow of blood by finger pressure

- Blood volume
- Degree of arterial tension

Referenced from: Figure 7.1, p. 121, Walsh and King, 2008
Viscosity/density of blood
Part 4: Know the limitations, improve the reliability

- Problems and the evidence
- Issues of reliability and validity
- Factors that influence the pulse
- Context of modern practice
Historical importance yet no evidence... pulse diagnosis is largely assumption based

- Are there differences in the pulse characteristics between the three pulse positions Cun, Guan, and Chi?
- Are practitioners capable of discerning the range of minute features of quality that are said to be present in the arterial pulses?
- Can practitioners reliably discern these changes and agree with each other in their interpretation of the pulse?
Evidence...

Practitioner studies:

- **1977 Cole PC.** Pulse diagnosis and the practice of acupuncture in Britain [PhD]. University of Sussex, Sussex


- **1997 Craddock D.** Is traditional Chinese medical pulse reading a consistent practice: a comparative pilot study of four practitioners [BApSc]. University of Technology Sydney, Sydney

Student pulse studies:

- **2001 Walsh S, Cobbin D, Bateman K et al.** Feeling the pulse: trial to assess agreement level among TCM students when identifying basic pulse characteristics. European Journal of Oriental Medicine 3(5):25–31
Pulse variables and the ‘normal pulse’

Despite the effects that certain factors are believed to have on the pulse, such claims remain untested and continue to appear unchallenged in many contemporary texts.

- Seasons
- Gender
- Age
- Body type
Seasons

The human body is a reflection of the universe: a microcosm within the macrocosm

‘In the spring, the pulse will mirror nature and become slightly wiry or round; in the summer, it will enlarge and become flooding; in the fall, the pulse will float to the surface; in the winter, it will sink to the interior.’

Nei Jing (Ni 1995: p. 65)
King (2001) found statistically significant differences between Summer and Winter with respect to the ‘level of depth’:

- Summer: relatively superficial
- Winter: relatively deep (but not necessarily at the deep level of depth)

After Figure 6.5, p. 93, Walsh and King, 2008
Age

❖ Pulse rate:

❖ faster in children
❖ ↑ age = ↓ rate
❖ Reflects declining Yang Qi

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Range (bpm)</th>
<th>Average (bpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn</td>
<td>100–170</td>
<td>140</td>
</tr>
<tr>
<td>1</td>
<td>80–160</td>
<td>120</td>
</tr>
<tr>
<td>3</td>
<td>80–120</td>
<td>110</td>
</tr>
<tr>
<td>6</td>
<td>70–115</td>
<td>100</td>
</tr>
<tr>
<td>10</td>
<td>70–110</td>
<td>90</td>
</tr>
<tr>
<td>14</td>
<td>60–110</td>
<td>85–90</td>
</tr>
<tr>
<td>Adult</td>
<td>60–100</td>
<td>72</td>
</tr>
<tr>
<td>Adult men</td>
<td>64–72</td>
<td>68</td>
</tr>
<tr>
<td>Adult women</td>
<td>72–80</td>
<td>75</td>
</tr>
</tbody>
</table>


(a) Pregnancy

(b) Non-pregnancy
Gender

Comparative strength of men and women’s pulses:

- Left and right hands
- Relative strength of Cun, Guan and Chi positions
- Overall difference in strength (and sometimes quality) between genders
Evidence regarding gender

- Male pulses are generally rated more forceful than female
- Female pulses are relatively easier to occlude

King E 2001 Do the radial qualities of traditional Chinese medicine provide a reliable diagnostic tool?: an examination of pulse relationships stated in modern and classical Chinese texts [MSc]. University of Technology, Sydney

Walsh S 2003 The radial pulse: correlation of traditional Chinese medicine pulse characteristics with objective tonometric measures [PhD]. University of Technology Sydney, Sydney

- No relationship between gender and left/right strength balance
  - The right hand pulse most often was strongest

Veracity of long-held assumptions change over time...

- Temporal change in diet, lifestyle, environmental pollution, pace of life, impact on the general health of the population, generating different health problems - classic knowledge does not stand the test of time

- Technological advances mean the eradication of some diseases and the control of others - pulse qualities have changed prognostic meaning

- Conditions once rarely seen are occurring with greater frequency. For example, in Asia, cardiovascular disease such as arteriosclerosis and hypertension (genetic, lifestyle environmental factors)
Discrepancy between what is written in the classics regarding pulse and what maybe occurring in contemporary industrialised populations raises further issues on the validity of pulse diagnosis:

Is pulse diagnosis a sound diagnostic tool, and can it be relied upon to produce consistent results?
Can practitioners reliably discern these changes and agree with each other in their interpretation of the pulse?

Evidence

- **2001**  King E  Do the radial qualities of traditional Chinese medicine provide a reliable diagnostic tool?: an examination of pulse relationships stated in modern and classical Chinese texts [MSc]. University of Technology, Sydney

- **2002**  King E, Cobbin D, Walsh S et al  The reliable measurement of radial pulse characteristics. Acupuncture in Medicine 20(4):150–159

- **2003**  Walsh S  The radial pulse: correlation of traditional Chinese medicine pulse characteristics with objective tonometric measures [PhD]. UTS
No traditional pulse quality felt because...

- Mutating pathogen
- Initial immune response
- Qi/Blood/Fluid quality variations means some pulses won’t form
- Variables such as age, life history
- ‘Pulse diagnosis’ is also a misleading term
PART 5: Pulse Method

The reliability process begins with each practitioner:
- a recognition of limitations of pulse diagnosis;
- its problems; and
- their impact on the use of pulse.

In this way, the impact of these ‘extraneous variables’ begins to be controlled.
Developing a systemised approach which puts together the pulse procedures into an organised examination process.

1. Is pulse diagnosis appropriate?
2. During consultation – when should the patients pulse be taken?
3. Order of gathering information from the pulse
4. Diagnostic interpretation of pulse assessment findings
1. Is pulse diagnosis appropriate?

- Pulse diagnosis is not always required nor necessarily an appropriate assessment technique to use
  - System of CM practice
  - Presenting problem of the patient
    - Organs and associated problems
    - Dysfunction to the movement, production or storage of Qi, Blood, Essence and Fluid
    - Emotional issues and psychological based illness
    - Management of chronic illness
    - Non-musculoskeletal related dysfunction/illness (e.g., EPAs)
2. When to take the pulse during consultation

• Pulse sits within the four diagnostic approaches
  • Questioning, observation, listening/smelling and palpation

• No strict order in gathering information from these categories:
  – At the beginning of consultation?
  – At the conclusion of consultation?
General guidelines

• Beginning to ensure no bias
  – but the problem here?

• At the conclusion as a confirmation of information gathered by other means
  – but the problem here?

• Pulse is useful to indicate incongruence in other assessment methods

• Easily influenced in the absence of overt illness – thus be aware of extraneous variables always!
3. Order of gathering pulse information

Pulse diagnosis is a three staged process:

1. Initial impressions
2. Specific pulse assessment
3. Diagnostic interpretation
Stage 1: Initial impressions

- Step 1: locate the pulse positions
- Step 2: Feel the overall pulse at Cun, guan and Chi
- Step 3: Feel the overall pulse at the other levels of depth
  - Is the pulse easy to find?
  - Is the pulse felt clearly?
  - Are there any distinct or unusual presentations of the pulse and related parameters?
  - Is the pulse strong, weak or of normal strength?
  - Do your first impressions match with the individual’s physical build and apparent state?
  - Does the pulse feel fast or slow?
Stage 2: Specific pulse assessment

• Focus upon any ‘dysfunction’ identified in Stage 1
• Assess for any other ‘dysfunction’ occurring in the other parameters
• Don’t incorporate the ‘normal’ parameters
Assess individual pulse positions
- Relative differences in strength
- Absolute differences in strength

Assess each of the parameters in turn
- 1. **Pulse rate**: > <, or normal?
- 2. **Rhythm**: regular, irregular?
- 3. **Depth**: which level is strongest?
- 4. **Length**: is the pulse long (four or more positions) or short (two positions)
- 5. **Width**: is the pulse thin or not thin?
- 6. **Force**: overall force? How does strength vary between positions, arms?
- 7. **Pulse occlusion**: easy of not easy?
- 8. **Arterial tension**: is it increased, normal or absent?
- 9. **Flow wave/contour**: Are there changes?

**Inter-arm differences**
Relative differences in strength
Absolute differences in strength
- Arterial tension
- Ease of occlusion
• The practitioner builds a diagnosis based on the pulse by adding the assessment of one parameter to another
  • This could form a ‘discrete’ pulse quality
  • If not, this is not a concern as all aspects of the pulse can still be used – assessment of individual parameters are just as informative as using theoretical systems and pulse qualities
Stage 3: Diagnostic interpretation

- Do your findings match a pulse quality
  - Do the parameters match
- Do your findings fit the assumptions of a particular theoretical pulse assumption system
  - Five phase, San Jiao, Qi/Blood?
  - Pulse qualities?
  - Eight principles?
- Combine your findings from other diagnostic techniques (questioning, observing etc)
Advice for ongoing practice

1. Know the definitions/parameters, know your theory
2. Practice – build up your range of sensory references
3. Relate findings of dysfunction back to Qi, Blood, Yin and Yang – understand the normal presentation of a parameter and so you can explain/diagnose when its dysfunctional form appears
4. Don’t always expect to feel a pulse quality
   • An individual maybe getting sick
   • There is no quality/distinct pulse to be felt (eg, Qi xu)
5. Check for alternative explanations
   • Extraneous variables, alternative explanations for findings
6. Pulse diagnosis is a misnomer!
7. Persevere – it is alot easier to learn and practice than some people would let you believe
8. Develop a pulse method that suits you but allows all aspects of the pulse to be assessed and none missed
• **Remember: it is the one pulse we all feel.** Every system of pulse diagnosis, in every country uses the same pulse.

• Whether traditional, modern or biomedical **all systems use the same pulse**

• The difference? Is in its **interpretation**, the **theoretical assumption** system used to interpret any changes assessed in the pulse.
END