CHAPTER 2

Alignment and geometric shapes

Introduction

A lot of information can be gained by looking at the body's skeletal landmarks and plumb line. I want to add to that perspective with the concept of seeing all the body's segments as three-dimensional, and how the influences of alignment (placement), dimension (shape) and asymmetry must be included in an assessment.

Alignment includes the placement of the body segments in space, in three-dimensional relationship to one another, as well as to the whole body. We will expand this idea in the next few chapters.

Being able to assess the alignment of the whole body helps us understand primary and secondary contributors to a particular individual's symptoms. Sometimes it is easy to imagine that all people who have the same symptoms share the same body patterns of alignment and might therefore benefit from the same treatment. These two people have low back pain, which is a common complaint. Do they look the same?

It is important to see that although these people share the same complaint, each pattern adds stress to the back in a different way. A different treatment protocol will be needed to match these two unique patterns.
Alignment and geometric shapes

(Note: The majority of the photos in this book show the clients and students demonstrating their 'before' session photos. While their patterns might be exaggerated, it also makes it easier for you to see the patterns.)

Common patterns of alignment

Observe the following common patterns of alignment.

1. ‘Suck-and-tuck’ position
2. Dancer position (extension)
3. Slouched posture (flexion)
4. A dentist’s position (rotation)
Common patterns of alignment

Many of these patterns have been learned in order to achieve a specific result. Although they may be effective for the desired goal, they may also result in certain unwanted consequences elsewhere in the body. Some of the adverse consequences are outlined below.

1) Suck-and-tuck position

**Action**
Suck in abdomen.
Tuck pelvis under.

**Purpose**
To stabilize the spine.
To improve posture.

**Consequences**
Possible compression and a decrease in the range of movement of the hip and spine.
Moves trunk and pelvis alignment behind midline of hips and legs.

2) Dancer position (extension)

**Action**
Lift up chest.

**Purpose**
To elongate the aesthetic line.
To lift off the legs.

**Consequences**
Stretching the front of the chest.
Possible compression in lower back, which decreases the shock absorption through the spine. This would be a negative consequence for a ballet dancer.
3) Slouched posture (flexion)

**Action**
Relax the trunk.

**Purpose**
To let go, be casual, relieve stress.

**Consequences**
Compression in the chest, decreased breath, increased pressure in the abdomen and low back.

4) A dentist's position (rotation)

**Action**
Rotate body segments around center of body.

**Purpose**
To negotiate the patient, chair and task.

**Consequences**
Bending without adequate support and prolonged, uneven stress on right and left sides of body and trunk compression affects dexterity of fingers and hands and spinal rotation.

Clearly, each isolated action influences the whole-body pattern. This book will provide a framework for understanding the body as a whole system.
Three planes

The body can be divided into three planes. We will look at each of these planes separately, then combine them to give a simultaneous three-dimensional (3D) description of the alignment, since any real analysis of a 3D object must include all three planes. The body is three-dimensional and therefore, if an optimal change to a body segment occurs, we need to take into account its effect within all three planes. We must consider that a simple change in one plane in one body segment will also affect all other segments of the body, in all three planes.
Let’s simplify this even more, by looking at six views of the body.

1) The anterior view – from the front.
2) The posterior view – from the back.
3) The right view – from the right side (sagittal).
4) The left view – from the left side (sagittal).
5) The bird’s eye view – overhead view of the body (transverse).
6) The worm’s eye view – view from the floor, beneath the feet (transverse).

When we observe just one view, we can see two of the three relationships:

1) Front or back views: we can observe right to left (R–L) placement, and high to low placement.
2) Right or left side views: we can observe anterior to posterior (A–P) placement, and high to low placement.
3) Overhead (bird’s eye view): we can observe anterior to posterior (A–P) placement, and right to left (R–L) placement.
4) From feet up (worm’s eye view): we can observe anterior to posterior (A–P) placement, and right to left (R–L) placement.
Three planes

1) From the front and back views, what do you imagine to be this client’s complaint or focus for a session?

2) Now, look at the two side views. Do you still have the same focus?

Possible theories:

1) You are drawn to the client’s left leg and hear that she had to wear a brace on her left leg at night time when she was two years old. This was to correct her extreme external rotation of that leg.

2) Or, from the side view, you are drawn to her strong hyperextension pattern at both knees.

3) Or, from the front view, perhaps the fact that she looks shorter or more compressed on her right side at her knee, hip, chest to shoulder.

4) Or maybe she expressed her history of feeling self-conscious and letting her chest sink down, so she felt more hidden. You might wonder if it is her chest that pushes down on her abdomen and pelvis, which then pushes the lower legs back.

5) Or maybe she described her passion for being a pitcher on a softball team and how she plants her left foot to help control her right pitching arm.

6) Or you are drawn to her front view, with her shoulders rolled in, her legs rolled in, her chest narrow in front and wide in the back.

7) Or you might be influenced by her comment that one teacher tried to correct her posture by having her ‘reach for the sky hook’. She hated it and hopes she won’t ever have to do that again!

Oh my! Where does one begin?

LET’S GET STARTED!
Alignment and geometric shapes

Abstract shapes

To train our seeing, let's begin with taking a look at these abstract shapes.

Pay attention to their difference in shape and size.
Identifying geometric centers

The spatial geometric center of an object is the centroid. When an object is asymmetrical, its center point is toward the larger end. Look at each of these shapes and determine the location of the center of each shape. Place a dot where you think is the spatial center point.

Exercise 2.1

As you glance at the shapes, you will begin to get a sense of how to visually find this center point. Place a transparency over these shapes or use a pencil to locate and mark the geometric center of each shape.
Alignment and geometric shapes

Placement

In examining the alignment of body segments, we first look at the placement of the geometric centers, then at the relationship of the segments or geometric centers to each other. Keeping the three planes in mind, we could say that the placement of one part is right or left, up or down, anterior (front) or posterior (back), to the other.

Exercise 2.2

First, locate and mark the geometric center of each shape in the pairs below.

And these...
Now, lay tracing paper over the page and draw lines to connect the center points of these pairs of shapes. Draw the lines and then look at the lines by themselves, on the tracing paper.

And these...
Alignment and geometric shapes

Exercise 2.3

In these irregularly shaped objects, consider the placement of the geometric centers in relation to each other and to the horizontal line of the ‘floor’.

![Diagram of shapes A, B, C, D]

In A and B: If you begin by looking at the lower shape resting on the floor — then the upper shape is centered left of the lower shape.

In C and D: The upper shape is centered to the right of the lower shape.

Because of the position of the upper to the lower shape, notice that all four examples are at slightly different angles to each other.
Notation of placement

It is useful to transfer your observations and assessments to the patient’s chart without the time-consuming narrative style. These notations can assist your problem-solving during a session and they serve to remind you to compare changes from session to session. They also are useful in writing reports and communicating to your client and other practitioners. In order to make this information easily accessible and visually clear for you and other therapists, we will look at several methods of notating. You will discover what is most useful to you. The following figures show a simple way to quickly notate intersegmental relationships from the right to left perspective.

Symbols

First, place dots to locate the geometric center of each segment. Next, designate a reference point by placing an X that is centered either above the top segment or below the bottom segment. Arrows can then be used to denote the direction of displacement. The distance of placement off-center from the segment below (or above) determines the length of the arrow.

In this example, we start with the reference point (X) at the bottom:

The length of the arrows designates the amount of segmental displacement in relation to the segment immediately above it (when starting from the bottom) or below it (when starting from the top). As you can see, B is displaced to the right of A, C is displaced to the left of B, and D is also displaced, to the left of C.

In this example, notice that the middle segment arrow is longer, as its center is further left of the bottom segment.
Alignment and geometric shapes

Exercise 2.4

In relationship to the starting point X, which is segment 1:
1) 2 is placed to the left of 1.
2) 3 appears slightly left, over 2.
3) 4 is more right of 3.

Whether you start from the top or the bottom, X marks the reference point. Since the arrows indicate displacement from the first segment, there is no arrow at the reference point segment. And there is no arrow when the segment is centered over another.

This assessment starts from the top and goes down. There is no arrow on the starting point segment – it is the reference.

Here is the same pattern, only this assessment starts from the bottom and goes up. There is no arrow on the starting point segment – it is the reference.

Notice the difference in reading this pattern, from top to bottom and bottom to top. We need to be aware of both patterns, as the consequences on a body would be quite different from bottom up, or from top to bottom.
Outlining segments from photographs

Exercise 2.5

Starting with the illustration (A):
- Observe the illustration: upper chest, neck, head. Notice that drawing B (outlined body segments) outlines the right side of his chest, from the right view, and does not include the left side of his chest.

On the outline (B):
- Add dots to designate geometric centers (the centroids).
- Connect the dots to observe placement changes. That is, the zig-zag of the line moving left or right of center.

On the ball body (C):
- Add dots for the position of geometric centers, then connect with lines, to observe placement changes.
- Add your reference point X to the bottom, then add arrows to notate direction and amount of displacement for each segment.
- Using a different colored pencil or tracing paper, add your reference point X to the top, then add arrows to notate direction and amount of displacement for each segment, from this opposite direction.

To recap the notation process:
1) Outline body segments.
2) Add dots, to show geometric centers.
3) Connect the dots with lines.
4) Look at the angle changes, from one segment to the next.
5) Add your X as a reference point.
6) Add arrows to denote which segments move to the left and which move to the right of center, by degree (arrow length).
7) Notice the difference in degree (arrows) when your assessment begins from the reference point (X) at the bottom segment up vs. from the top down.
Alignment and geometric shapes

We've looked at two-dimensional shapes, found their centers and considered their relationships to one another:

1) The shapes.
2) Add geometric centers (dots).
3) Add relationship, connect geometric centers with lines to show segment placement.
4) Add arrows, to show placement of segments to left or right of center.

What happens when we consider other forces acting on these shapes? Forces like weight, effort, gravity, etc.

- Adding weight (larger or heavier shapes will have more force and/or resistance, and will affect the surrounding shapes).
- If segmental boundaries are flexible, surrounding shapes can change the shape of a segment (i.e., heavier shape above will compress and may widen a flexible shape below).

We'll explore these forces and more, as we progress through the book and continue to develop seeing skills.