

High Brass Pedagogy

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“CARE AND FEEDING OF YOUR HIGH SCHOOL TRUMPETS”

Tone Quality

Embouchure and Tension

Breath Control

Endurance/Range/Pressure

Scales/Arpeggios/Key Signatures

Articulation

Single Tongue

Double/Triple Tongue

Sight-Reading

Ear Training and Playing by Ear



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STARTING OUT

Breathing

Two Phase Breath – Diagram

Breathe low, breathe high

Low for volume of air, high for size of air column

Move air from the bottom up, keeping upper passages open

Empty lungs like squeezing toothpaste tube from bottom up

Use the lower abdominal muscles (belt area) to move air –
push air up and out from the bottom keeping the tube
or bag big all the way up – do not squeeze the bag from
the middle (i.e. upper abdominals or stomach area) as
this only serves to compress the air column locking up
the throat and tightening the sound

Keep chest area open – don't collapse

Keep air column big all the way up to the embouchure

Maintain an open pipe from lower lungs to lips

Posture – “Sit while standing”

Maintain arch in lower back

Keep natural curve to spine

Come up out of the hips as if suspended by a string

Keep back from pressing against back of chair

Keep shoulders relaxed, but not slumped

Keep chest up (floating), but not tense and rigid

Keep head balanced on top of spine (up-down/side-side)

Bring instrument up to mouth with the arms – bend at
the elbows without raising shoulders

Do not move head towards instrument – bring the
instrument to the head

Keep head up and neck straight to avoid putting a kink
in the “air-hose” in the throat

Keep hands and arms relaxed

Tension has a way of traveling up arms and shoulders,
tensing the throat, constricting the airflow and
dampening resonance in the sound

Keep both feet flat on floor for good balance

Good source for studying posture: *The Alexander Technique*

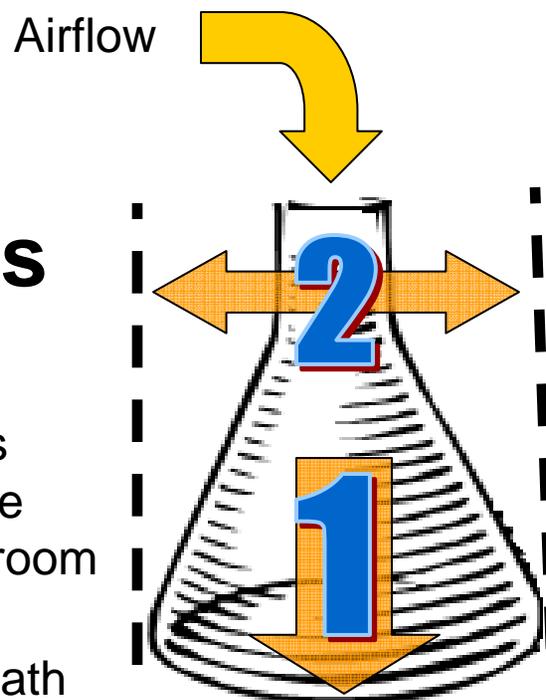
<http://www.alexandertechnique.com/>

<http://www.alexandertech.org/misc/musician.html>

The Two-Phase Breath

Phase One Lower Lungs

1. Diaphragm flexes drawing air into lungs
2. Abdominal organs are pushed out to make room for air in lower lungs
3. Approximately $\frac{3}{4}$ breath supply is attained



Phase Two Upper Lungs

1. Intercostal muscles stretch as lungs expand against ribs
2. Chest area opens up making room for large airflow
3. Approximately $\frac{1}{4}$ remaining breath supply is attained and upper body is enlarged for more efficient airflow

Breathe Phase-One breath for volume of air

Breathe Phase-Two breath for efficiency of outflow

Blow air up and out by using lower abdominal muscles

Use muscles in the region of your belt buckle, NOT upper stomach muscles

This keeps the air column large and powerful all the way up to the embouchure

Breathing exercises –

- 1. Hands on stomach and chest – feel expansion in both areas while inhaling and exhaling – also check to make sure that the inhale sends the air down low first and the exhale empties the lowest parts first – inhale: “Get fat”/ exhale: “Get skinny”**
- 2. Breathe through back of mouthpiece**
- 3. Breathe through various size pipes and straws**
- 4. Breathe while walking or running – in for five counts, out for five counts; in for four, etc.**
- 5. Use visual aids such as blowing hand away and drawing it back with the breath – Breathe in and out in various counts with steady beat**
- 6. Hold paper in front of face and blow – compare using a relaxed flow as compared to a tight “S” flow**
- 7. Hold a sheet of paper against the wall using breath**

More breathing exercises – Breathing Gym DVD

<http://www.focus-on-music.com/site/index.cfm>

Arnold Jacobs Materials and Tools – (Excellent resource)

<http://www.windsongpress.com/>

Some helpful concepts –

Sound is moving air – big air = big sound / small air = small sound / constricted air = constricted sound

No such thing as up and down, only forward-moving air

fast and slow vibrations (narrow and wide wave patterns)

Instrument is an amplifier broadcasting what the body is doing –

YOU are the Instrument! “Trumpet in the Matrix”

What is “REAL”? The “real” trumpet is in the mind;

The trumpet in the hand is only a reflection of the real –

it can only echo what is happening (or not) in the mind

“Support” is moving air, *not* tense muscles

Buzzing and First Sounds

Blow air across room

Blow air across room with side of mouthpiece rim on bottom lip keeping mouthpiece in a vertical position, i.e. perpendicular to the lips

Rotate mouthpiece up to connect with upper lip creating a seal and allowing the lips to react with moving air inside mouthpiece

Begin sound without using the tongue – lips in an open position and gradually bring lips together until they react with the air

Listen for an airy, breathy sound on the mouthpiece buzz – if the mouthpiece sound is too pure it generally means the lips are too tight or teeth are too close together

Vowel sounds – “OH” on inhale AND exhale

**Yawn is most natural and efficient way to get a good breath
The yawn shape in mouth and throat will also be most effective
for moving the air out (in middle and lower registers, at least)**

**Allow lips to ride on the air, not press into it – try this with your vocal
chords and see how it affects the sound of your voice: squeeze
your larynx together and talk, then relax and talk – the lips
function the same way – all we are doing is moving the vibrat-
ing mechanism farther forward**

Begin buzzing in middle or lower register then expand up and down

Practice matching pitches and simple scale and arpeggio patterns

**Train the ears to hear correct intervals and reproduce them
on the mouthpiece like singing (You don’t consciously control
your vocal muscles to sing, you just sing)**

**Train brain to think “Music” not mechanics – don’t control sounds
by controlling muscle, control sounds by thinking music –
“Sing with your lips” (Arnold Jacobs) – Buzz simple melodies**

**Hold the mouthpiece on the end of the shank with the thumb and one
one or two fingers only – avoid using excess pressure**

Embouchure Basics

Aperture – correct/collapsed – what causes each?

**Side view – correct/incorrect – how incorrect muscle movement
lip placement**

Teeth as foundation – lips set on Teeth (not each other, not on mpc)

High vs. Low playing – how to firm up embouchure without stopping airflow

Why pressure works/why pressure kills endurance

Mpc placement – up/down

Oral cavity open/relaxed, low tongue placement – “OH” vowel

Jaw down and slightly forward, chin flat and pointing down

Aperture – oval shaped opening caused by blowing air through a soft “M”

Lips together but not pressed (set on teeth, not each other)

Lips fairly moist for flexibility and response

Mpc types –

Wide/flat rim – Helps endurance/hurts flexibility

Narrow/rounded rim – Helps flexibility/hurts endurance

Wide diameter – Larger sound/may hurt range and endurance

Smaller diameter – Helps range and endurance/smaller brighter tone

Deep cup – Darker tone/hurts upper register and projection

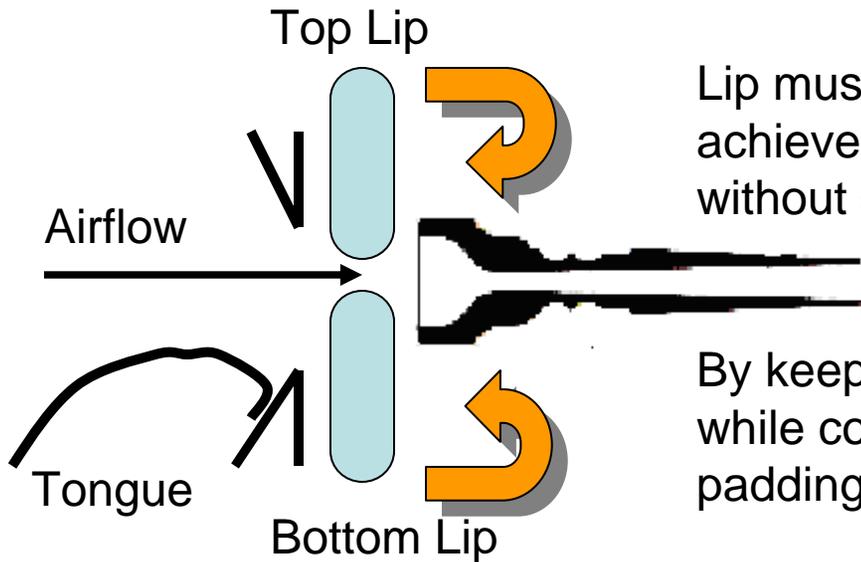
Shallow cup – Helps upper register/brightens tone

“V”/ “B”/ Bowl cups

Opening the throat

Backbore shapes

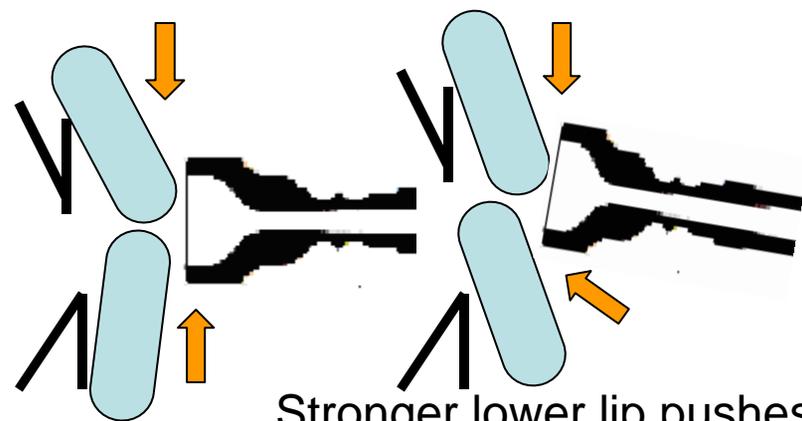
Embouchure Side View



Lip muscles flex and compress towards teeth to achieve adequate firmness for upper register without closing off the flow of air through the aperture

By keeping the corners of the mouth firmly in place while compressing towards teeth, the lips form a firm padding of support under the rim of the mouthpiece

If the lips are pressed together to play upper register notes the lip tissue gets pushed into the cup of the mouthpiece and the buzz occurs on a weaker, more sensitive area of the lip. Airflow is blocked and more mouthpiece pressure must be applied to maintain firmness for high notes.



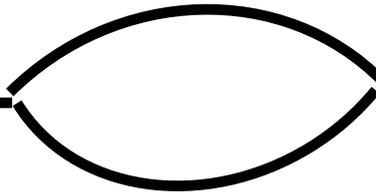
Stronger lower lip pushes up forcing top lip out into cup

Embouchure Basics

The Correctly Formed Aperture

Causes

1. Firm Corners
2. Soft Middle
3. Flowing Air



Outcomes

1. Productive Airflow
2. Resonant Tone
3. Clear Response

1. Lips Too Tight
2. Teeth Too Close
3. Insufficient Airflow



1. Excess Back Pressure
2. Scratchy Tone
3. Poor Response

The Collapsed Aperture

Embouchure problems to watch for –

- 1. “Smile” embouchure – thins out lips, limits range and endurance, produces a thin, bright sound**
- 2. Bunched chin – causes fuzzy sound, limited range, response and articulation problems**
- 3. Wet area of lips appearing outside mouthpiece**
- 4. Lower lip disappearing during upper register playing**
- 5. Improper mouthpiece placement – too high or too low – higher placement darkens tone but limits range, lower placement may help with range but it thins out the sound**
- 6. Puffed-out cheeks or “bubbles” above or below mouthpiece**
- 7. Puckered lips protruding towards or into the mouthpiece**
- 8. The Valsalva Maneuver – closing throat and bearing down on air**
- 9. A “tear drop” shape in the middle of the upper lip – difficult for high brass players to deal with**

Formation

- 1. Say “M” – “Mom, I’m mad” – Set lips on teeth**
- 2. Blow air through the “M” to create aperture**
- 3. Firm lips for upper register by a combination of rolling lips in towards teeth and puckering – “A pucker tempered by a smile” (Donald Fink, *The Art of Trombone Playing*); Relax lips and lower jaw for lower notes allowing lips to roll only slightly forward to buzz on a softer surface area (see 9 and 10 below)**
- 4. Teeth fairly (almost) aligned and held open**
- 5. Tip of tongue is used for articulation, the back and middle is used to shape airflow for range and tone color**
- 6. Minimize mouthpiece pressure – use muscles to do what arms are trying to do – compress lips on teeth so they can vibrate faster**
- 7. Buzz on middle of the lips where the wet meets the dry keeping middle relaxed enough to vibrate but firm enough to sustain pitch**
- 8. Keep corners set firmly on the canine teeth and keep the middle area soft enough to vibrate but firm enough to produce the pitch – Think of a guitar string anchored on either end by the bridge and the nut with the string vibrating in between**
- 9. Higher notes are produced by a combination of firm corners and a flexed middle with a steady upward push on the air column (“A pucker tempered with a smile”) – The muscles flex and compress on the teeth (the smile) while maintaining a “padding” under the rim of the mouthpiece (the pucker) and keeping the aperture open to allow air to flow and vibrate the membranes – if the aperture collapses and stops the flow of air, the sound will stop; if the aperture only partially collapses while still allowing some restricted air movement, the sound will become scratchy or gravelly**
(Think of high notes as fast, narrow, focused vibrations)

10. Lower notes are produced by allowing the lips to relax and roll slightly forward in the middle while still maintaining contact with the teeth and keeping the corners firmly set AND opening the jaw to allow a larger column of air to flow (and larger vibration patterns) – if the lips are blown too far forward (away from the teeth and into the mouthpiece) the aperture will be filled with flabby muscle tissue and the sound will become gravelly, blatty or have a double buzz; it will also be very difficult to play louder dynamic levels; if the teeth stay too close together there will be too much hard surface next to the teeth to allow them to vibrate at the lower-wider frequency patterns and not be enough room inside the mouth to produce the large air column needed for those vibrations (*Think of low sounds as big, wide vibrations*)

Tone Centering and Resonant Intonation – “Tune the Tone”

When using a tuning device, find the best, most resonant sound first then look at the tuner and adjust the tuning slide accordingly

Diagrams – CD page 26

Centered sound w/overtones –

Bathroom resonance and Feedback

Air molecules in any chamber or length of pipe will vibrate at certain frequencies determined by the size and shape of the chamber and the overtone series produced therein

Good feedback / Bad feedback

Overtones determine the color and quality of sound

Sound pushed up (sharp) – Dampens overtones

Sound squeezed from both directions – Dampens overtones

Looking for an “OH” or “AH” vowel sound in the tone

Colorful, productive sound needs to have both highs and lows

A bright sound and a dark sound at the same time – the highs for clarity and carrying power, and the lows for warmth and mass

A dark sound without highs is “woofy,” does not project well and difficult to tune with due to lack of upper overtones

A bright sound without lows is thin and “edgy” and only projects “white noise” or buzz – without lower overtones there is no “body” or core to the sound thus making intonation difficult

A DarkBright sound has a full and balanced compliment of overtones for good projection and intonation

Bending Exercises – looking for the “sweet spot” or the point of optimum resonance, the most efficient sound

Keeping sound consistent – concentrate on flow and tone

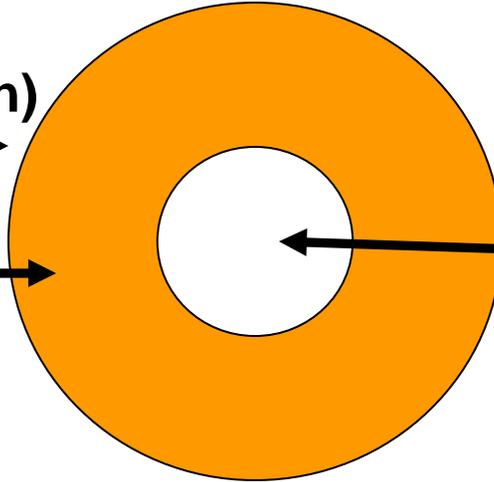
And let the fingers change the pitches – stay in the middle of your sound and let the notes find themselves

The Centered Sound

Available Space
For Pitch (Pipe Length)



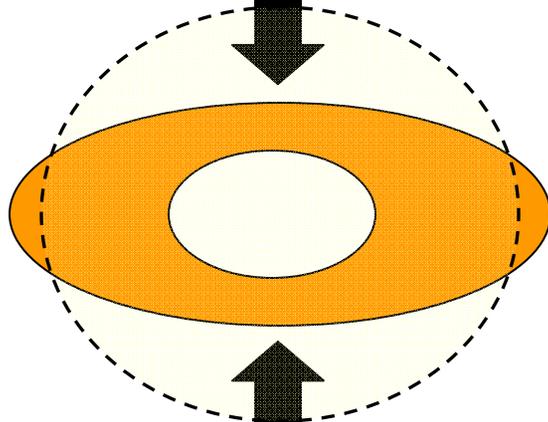
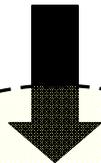
Overtone



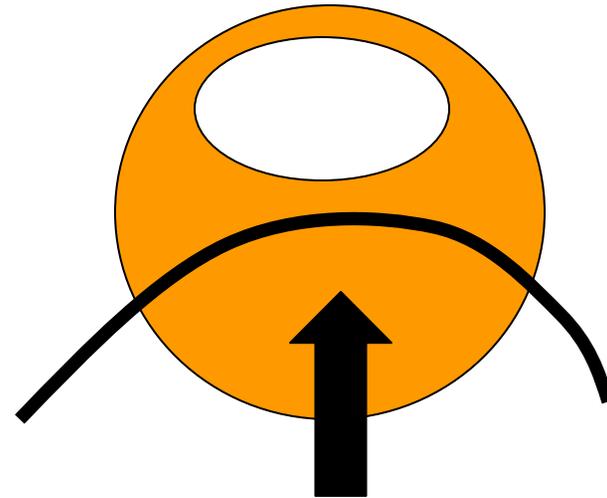
Buzz Frequency



The Squeezed Sound



Playing Above Center



When the sound is correctly balanced and resonant less effort is required to play thus improving range and endurance, intonation improves, accuracy improves, response improves flexibility improves

Tone determines the whole package – intonation, response, endurance, accuracy, flexibility

Tension anywhere in the body tends to dampen the tone – try talking with tense shoulders and stomach, then relax and notice the tone of your voice – it expands in size, depth and resonance

Tension also tends to sharpen the pitch and thin out the sound

Avoid Valsalva maneuver when ascending into upper register – practice blowing air away from the instrument

Articulation – Make sure the air and the lips do their jobs without getting in the way of the tongue, and make sure the tongue does its job without getting in the way of the airflow and lip position – each part of the body has its own specific job, but often the lips will try to help the tongue, or the jaw will move with the tongue, or the tongue will stay in the way of the airflow after pronouncing the “Tah” for an attack, etc.

Slurring between notes – keep airflow steady and sound consistent

Valve Slurs – Cichowicz warm-up, Flow Studies, Clark Studies, (see pp. 27-30 on CD)

Lyric etudes (Bordogni, Concone, etc.)

Keep airflow steady as valves and notes change

Keep embouchure still from note to note (don't try to shape each individual note)

Keep tone consistent from note to note

Water faucet – water keeps running steadily as you pass your finger through the stream

Lip Slurs – Slurring within the harmonic series on the same valves

Keep airflow steady ascending and descending

Don't back-off for descending passages – the aperture must open up for lower notes and a larger airflow is required to keep the lips vibrating at those frequencies

Articulating with the tongue –

Speech patterns – tongue and lips shape sounds without stopping the flow of air

“Attack” is not an accurate description for articulation

Tongue placement

Front or Tip – “T” “TS” “TH” “P”

Back – Vowel sounds like “AH” and “OH”

Practice articulation away from instrument using air patterns

Listen for clean starts and consistent vowel sounds.

Tongue movement

The Tip moves up to touch the gums directly above top teeth while the back stays flat in the bottom of the mouth. Avoid thrusting the tongue forward “TA-TA” not “TEEAH-TEEAH,” “TSEEAH” or “TOYTOY”

Practice speech/articulation patterns away from the instrument – blow rhythmic air patterns found in the music being performed. The back of the tongue stays flat and the tip moves up and down. Minimize movement inside mouth. If the back moves the airflow is affected and the tone and intonation change

Practice first note of phrase in the rhythm of the phrase to Work out rhythm and steady tone/pitch, then add notes

**Note shapes - ■■■, not ►►► or even ◄◄◄ (“Dwah”)
Keep sound and air consistent from note to note and within each individual note – start and end each note with your best sound**

Jaw movement

**Tendency of throat and lips to “help out” with articulation
Keep bottom teeth perfectly still in relation to articulation
Only the tongue moves, the jaw’s job is to determine size of air column for high or low register playing.**

Check jaw movement by watching mirror or putting a hand on the chin while articulating an air pattern.

Legato tonguing – Soften the tongue and the “TA” becomes a “DA” sometimes it may be helpful to even teach “NANA” (“N” can only be made when air is allowed to pass through the nose; when the nasal passage is closed off for playing, “N” is just the right firmness for legato)

**Multiple Tonguing – Introduce double tonguing in the second year
Double tongue – “TAKATAKA” (Practice KAKA and KATA)
Triple tongue – “TATAKA”; “TAKATA”; “TADAKA”;
or “TAKATA-KATAKA”**

**Soft tongue – D and G, or even “N” and “NG”
(for most students – a few students will require more work on firming up the articulation)**

**More Vowel, less consonant – we want the sound of the instrument, not the sound of the tongue
Move air and sound from Point A to Point B
Always think crescendo to keep air moving while the tongue is moving**

Don’t allow tongue to disrupt flow of air

Practice articulation patterns away from the instrument

Listen for flow of air, clean “T” and “K” sounds, watch for jaw movement (it should remain still)

BREATHING GYM EXERCISES

From Breathing Gym DVD with Sam Pilafian and Patrick Sheridan

<http://www.focus-on-music.com/site/index.cfm>

1. Tension/Release – Push hands together and tense body muscles while inhaling, then release air and tension with an audible sigh.
2. Stretch: Trunk Twist – With feet parallel and arms in the air in an “L” shape, twist from side to side.
3. Flow Study #1 – Inhale on “OH” vowel while raising arms and exhale while lowering arms. Move air smoothly and evenly and change from inhale to exhale without stopping movement of air. Start with 6 counts in and 6 counts out, then change to 10 counts, etc.
4. Stretch: Flop-over – Inhale puffs of air while flopped over falling lower and lower to the floor with each exhale.
5. Flow Awareness Exercise – Paper airplane = soft playing, darts = *mezzo forte* playing, bow and arrow = loud playing.
6. Stretch: Two-way Stretch – Reach arms above head as high as possible while inhaling, then relax while exhaling and let arms hang.
7. Inhale Therapy – Put hand against mouth and try to inhale (“Fight for air”), then release hand after 4 counts and let air rush into lungs. Next, do this while trying to pull air into lower front, lower back, upper front and upper back. Next pull air in against your hand but allow a slight leaking of air into the mouth.
8. Stretch: Wrist Grab – Put hands behind back, grab left wrist with right hand, tilt head towards right and lean to the right, pulling and stretching. Then do the reverse side.
9. Exhale Therapy – Inhale while raising arms, then blow air out in two big “chunks” exhaling $\frac{1}{2}$ to $\frac{3}{4}$ in first “chunk” and then blowing even harder to expel the remaining “chunk” until there is no air at all left in lungs and continue blowing. Count through “chunks” 5-7 counts each.
10. Stretch: Elbow Grab – Reach left arm above head and bend hand towards the back of your neck. Grab your left elbow with the right hand and pull towards the right while leaning to the right and inhaling. Release the stretch and exhale. Repeat on the other side. Shake out hands, wrists, arms, legs and feet.
11. Oral Shape Therapy – Take a large breath and exhale in a panting motion beginning with a whispered “EE” vowel sound gradually moving towards an “OH” vowel sound. Follow this with the “Flow Awareness” exercises (paper airplane, darts and bow-and-arrow) maintaining the “OH” vowel.

12. Stretch: Whole Body – Link fingers together with arms behind back. Inhale while stretching back and pulling arms back. Next, do this while flopped over and pulling arms up above the back, inhaling and exhaling. Follow this exercise with a deep, relaxed sigh.

13. Flow Studies – Put the edge of your hand against (perpendicular to) your lips and inhale on an “OH” vowel sound; exhale blowing air on the palm of your hand to feel the flow. Inhale 4/exhale 4; inhale 3/exhale 4; inhale 2/exhale 4; inhale 1/exhale 4. Next reverse the inhale and exhale numbers. Then inhale and exhale evenly in decreasing counts (in 4/out4, in 3/out 3, in 2/out 2, in 1/out 1). You WILL GET DIZZY. Try to get comfortable and relaxed with a moderate amount of dizziness.

14. Quick Breathing – Blow out 3 counts and inhale on beat 4; blow out 3 ½ counts and inhale on the upbeat; blow out 3 ¾ counts and inhale on the last 16th note beat. Vary the tempo increasing the speed.

15. Strength and Flexibility: Preparation – Inhale repeatedly for 5 seconds without letting out the air, then “sip” air on top of already full lungs for 15 seconds. Let out the air for 5 seconds allowing body to flop and go limp. Follow this with a deep sigh.

16. Strength and Flexibility: Power Breaths – Inhale quickly and forcefully while stretching arms back; exhale quickly and forcefully pushing hands together. Do this exercise first inhaling in 1 count and exhaling in 1 count for several breaths. Follow this with inhalations on 8th-notes, triplets and 16^{ths} always following the rhythmic inhale with a one-beat exhale.

17. Strength and Flexibility: Main Exercise Sequence –

- a. Inhale 3 breaths in; exhale 3 out (full/empty)
Raise and lower arms in rhythm with inhale and exhale.
Repeat several times, follow with a sigh.
- b. “Throw the Ball” – Inhale 3 breaths while moving arm back as if to throw a football filling lungs completely. Release air and throw the ball following arm with the breath. Continue blowing and begin making a hissing sound as you begin to run out of air. Continue blowing until you are completely empty and body is completely compressed or collapsed. Repeat 2 or 3 times.
- c. Bow and Arrow exercise (as described above) with a full stretch on the inhale and a full compression on the exhale going into an audible hiss on the tail end of the exhale. The hissing sound gives an audible cue that we are still moving air. Continue blowing until there is no more sound coming out of your mouth. Repeat.

18. Breathing for the Brain – “Brain Breathing” can be used to help beat stage fright. You can “fool your body” into concentrating more on breathing than it does on being nervous. Extra oxygen is also very relaxing and helpful for concentration.

- a. “Follow Your Breath” – Close your eyes and follow your breath without trying to regulate it in any way breathing naturally and very relaxed. Think of the numbers 1 and 2 as you breathe. 1 is the exhale – the first part of your breath, and 2 is the inhale – the second part of your breath. If concentration begins to wander, gently bring it back to following your breath. Try to see the numbers. Vary the color of the numbers and the background.
- b. Breathe in for 6 counts, suspend the air in your full lungs for 6 counts keeping your throat wide open (hold air in using intercostals and diaphragm muscles only), and blow out 6 counts. During the “suspend” phase try to get comfortable with the air in your body and stay relaxed. At the end of each repetition shake out the tension in neck, arms and shoulders. Repeat the exercise using 8 counts for each segment.
- c. Repeat the “Follow Your Breath” exercise. Concentrating more on exhale can actually help the inhale.
- d. Repeat exercise “B” inhaling for 6, suspending for 12 and then exhaling for 6. Follow this with an 8 count inhale, 16 count suspend and 8 counts out. Close your eyes and follow your breath again as in exercise A (“1 out and 2 in”).

“The Law of Accommodation states that what is difficult today will become easier when practiced daily.”

Patrick Sheridan

BRASS SECTION DYNAMICS

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Warming Up

The importance of a warm up routine

- Stressing fundamentals and concepts of sound, rhythm and intonation
- Working problematic concepts related to performance repertoire
- Focusing concentration and “group think”
- Developing listening skills – individual, section, ensemble, auditorium

It’s important to apply sound fundamental concepts to every aspect of the warm-up and not let the exercises become “routine” or mundane. Warming-up or practicing with poor fundamentals will only reinforce bad habits making them harder to correct. Warming-up is a process for preparing the mind, ears and body for excellence. Anything less than this is a waste of time and energy.

Warming up the respiratory functions

- For sound and efficiency
- For concentration
- For establishing a quiet, relaxed environment

Breathing Exercises – (See *Breathing Gym Exercises* handout)

Inhale on an “OH” vowel – like yawning

Exhale on an “OH” vowel – “Big air in, big air out,” with nothing interfering with the flow of air between the lower lungs and the lips such as the larynx, back of the tongue, middle or front of the tongue, or the teeth

Warming up on the mouthpiece

- Gently warms and softens lip muscles to prevent stiffness and injury
- Gets air moving freely without cues from the instruments
- Gets an effective buzz started more quickly and efficiently
- Trains the ears and encourages the students to think more vocally and less mechanically thus improving tone and accuracy
- Helps train the muscles to work without excessive pressure (when mouthpiece is held correctly – thumb and one finger)

Begin buzzing on the mouthpiece in middle register

Begin buzz without using any articulation – establish a big, free airflow (“HO”)

Big air in (say “WOAH” backwards) and big air out (“HO”) nothing in the way

Listen for an open, airy, buzzy sound – don’t try to make it sound pure

Practice flow and articulation without mouthpiece first to establish a correct model to copy when using the mouthpiece

Gradually increase the range in both directions using something like
Cichowicz or Remington exercises
Keep sound smooth and connect pitches with glissandi (avoid bumps)
Give the students visual cues to direct the sound and air across the room
Remind students to breathe and keep neck, shoulders and arms relaxed
Repetition is good, keep reminding them about correct form
Repetition is good, keep reminding them...

Warming up on the instrument

Begin in middle register as above using no articulation at first (“HO”)
Establish a centered, resonant sound and maintain the same
color of sound from note to note with smooth connections.
Changes in tone indicate incorrect playing such as excessive
muscle manipulation, too much tension, blockage in the air
passage, etc., and these color changes affect intonation.
“Lead with the air,” let the valves change the pitches, not the lips
Gradually increase the range in both directions using something like
Cichowicz or Remington exercises
Keep sound round, centered and consistent from note to note
Connect pitches smoothly with steady forward airflow
Think “crescendo” throughout the line, ascending and descending
Give the students visual cues to direct the sound and air across the room
Remind students to breathe and keep neck, shoulders and arms relaxed

Tone Centering

Resonant Intonation

- Feedback and singing in the shower
- Overtones in nature and the solar system
- Overtones in the sound
- Every note contains within it the full overtone series
- Tone color is determined by varying degrees of amplitude of overtones in the sound

Difficulty of tuning Brighter sounds as opposed to darker – Discrepancies are more obvious making even slight variations in pitch very noticeable

Difficulty of tuning Darker sounds as opposed to brighter – Discrepancies are less obvious and everything sounds fuzzy and un-centered

Difficulty of tuning unlike sounds – Even if pitch level is the same, the notes will sound unstable and “out of tune”

What is sound? Waves of Moving Air Molecules

- Waves in nature - water, light, air, matter, energy
- Shape and size of air moving through instrument and room have a direct affect on the tone

INTONATION CONCERNS ON THE TRUMPET

This chart is *very* general and may not apply equally to every player or every trumpet. Various designs in instrument construction, choice of mouthpiece, throat and back-bore size and the strength and ability of the player all can affect intonation on individual notes or throughout the range of the instrument. Environmental concerns such as temperature will also affect the pitch level (e.g. warmer temperatures will raise the pitch level, and cooler temperatures will lower it).

LOW	F#	Somewhat sharp
	G	
	G#	Somewhat flat
	A	
	Bb	
	B	
	C	Somewhat sharp (“bright”)
	C#	Very sharp
	D	Sharp
	Eb	
	E	Somewhat sharp
	F	Sometimes slightly flat
	F#	Sometimes slightly flat
MIDDLE		
	G	
	G#	
	A	Somewhat sharp
	Bb	
	B	Sometimes slightly flat
	C	Somewhat sharp (“bright” – especially on most C trumpets)
	C#	Somewhat sharp
	D	Flat
	Eb	Flat (usually quite flat on C trumpets)
	E	Flat (usually quite flat on C trumpets)
	F	Somewhat sharp
	F#	Somewhat sharp
HIGH	G	Sharp
	G#	Somewhat sharp
	A	Sharp
	Bb	
	B	Slightly flat, but often sharp due to excess tension
	C	Slightly flat, but often sharp due to excess tension

ENSEMBLE INTONATION

JUST vs. EQUAL TEMPERAMENT

Interval	Equal Temperament	Just Intonation
Half step	100	112 (+12)
Whole step	200	204 (+4)
Minor third	300	316 (+16)
Major third	400	386 (-14)
Fourth	500	498 (-2)
Aug. fourth	600	590 (-10)
Dim. fifth	600	610 (+10)
Fifth	700	702 (+2)
Minor sixth	800	814 (+14)
Major sixth	900	884 (-16)
Minor seventh	1000	996 (-4)
Major seventh	1100	1088 (-12)
Octave	1200	1200 (0)

Example: Key of C Major

C	C#	D	D#	E	F	F#	G	G#	A	A#	B	C
0	+12	+4	+16	-14	-2	+10	+2	+14	-16	-4	-12	0

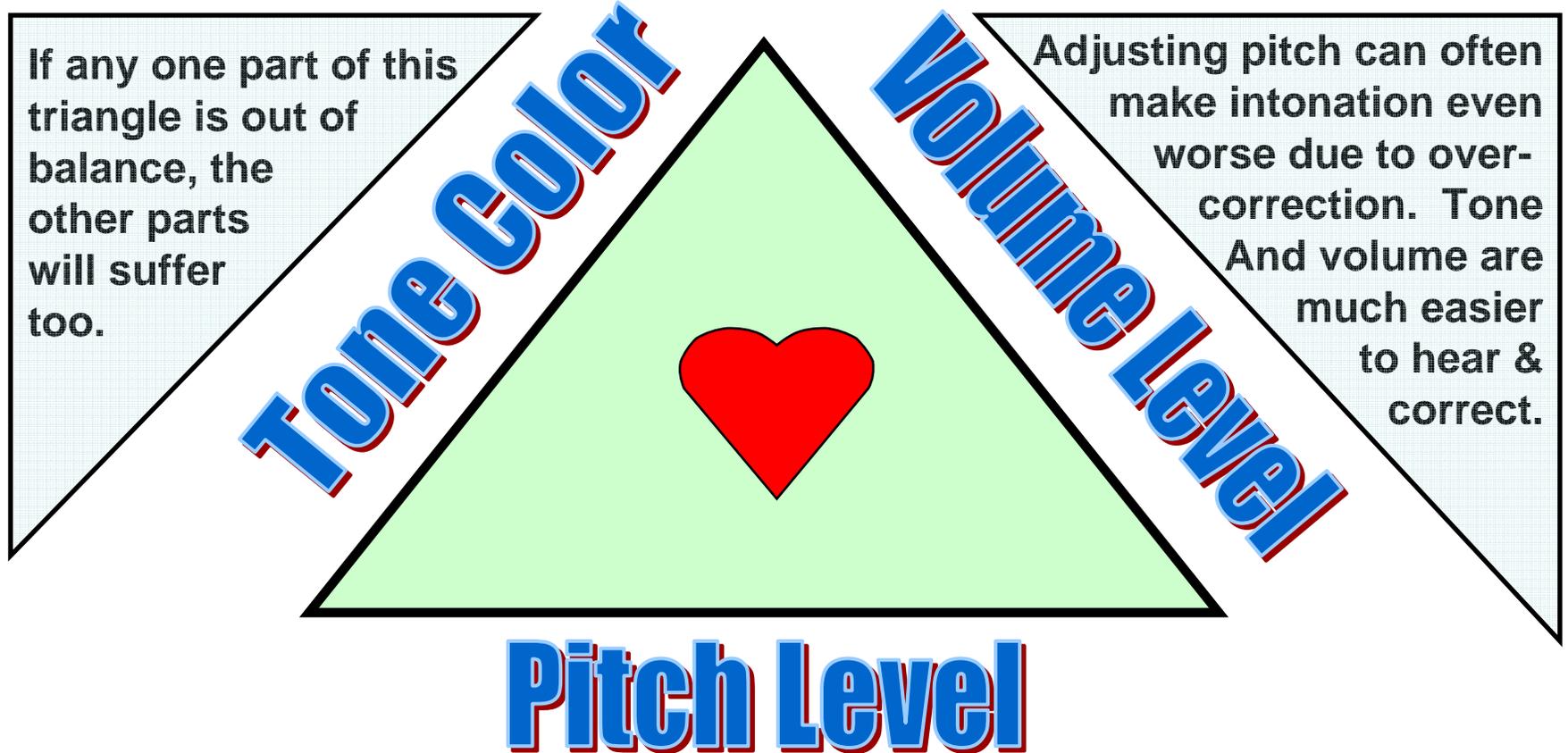
Example: Key of A Major

A	A#	B	C	C#	D	D#	E	F	F#	G	G#	A
0	+12	+4	+16	-14	-2	+10	+2	+14	-16	-4	-12	0

Notice that E in a C Major chord is 16 cents lower than the same note in an A Major chord. Also of note is the difference in the level of the C# in an A Major chord as opposed to the distance between the half step interval between C and C# in the key of C Major. F# and C# may have as much as a 26 cent pitch difference in their various harmonic applications.

The Intonation Triangle

If you match the tone color and the volume, you will usually have the pitch right too



Great sounding intonation is determined by more than just the actual pitch level. In order for a section to sound in tune there must be a blend of tone colors and volume levels on a horizontal level, each player listening sideways and fitting inside the tone and volume of the players on either side.

The Intonation Triangle

Pitch Level
Volume Level
Tone Color

If any one part of the triangle is out of balance the “intonation” will suffer – even if the actual pitch-level is aligned, the section will still sound “out of tune”

Tuning to the Tone

Find the centered sound first (see above) and then adjust the tuning slide
Tuning the slide to allow for incorrect playing will cause even more intonation
Woes by making flat notes impossible to play without false fingerings
And robbing sounds of overtones crucial for hearing pitch correctly

Just Intonation vs. Equal Temperament

Rehearsing

Singing – train ears and learn phrasing while resting lips
Buzzing – buzz exact pitches without aid of instrument – fixes accuracy
problems (cracked notes), response, intonation and tone
Practicing Air-Patterns – work on concentration, precision and air support
while resting lips
Practice “saying” the rhythms together – (see above) – Use a “TAH” sound
rather than a “TEE” to encourage a large oral cavity and to
practice getting the tip of the tongue down out of the way of
flow of air after articulating
Dissect and put back together – work on small sections of music – find the
crucial spot (even two or three notes), zero in on it, then add
groups of notes or phrases on either side
Play “The Metronome Game”
Working from Back to Front – Start with success and then move that
success backward toward the front of the passage
Tongue slurred passages to fix rhythm and precision
Slur tongued passages to improve flow and tone

Jobs of 1st/2nd Players

Who's right? Who tunes to whom?
Section leader sets pitch level by listening across ensemble
Section players listen sideways using Intonation Triangle
Flexibility to sound & pitch level
Must be willing to bend in order to blend

Aspects of Teamwork - Each player must know his job
Lead? Support? Get out of the way?

Balancing Volume from low to high

Articulation –

Speaking to a large audience requires exaggerated articulation and inflection

Consistency of sound from start to finish of each note

Note shapes - ■■■■, not ►►► or even ◄◄◄ (“Dwah”)

Keep sound and air consistent from note to note and within each individual note – start and end each note with your best sound

Toy-toy-toy/ Tsu-tsu-tsu/ Tseeah-Tseeah-Tseeh phenomena

Keep jaw stable while only the tip of the tongue moves

The shape of the mouth affects tone; the tip of tongue affects articulation

Tendency of throat and lips to “help out” with articulation

Matching articulation, note lengths and releases using speech patterns

Note lengths differ according to register –

Longer/wider wave patterns require shorter lengths to match higher pitches that have shorter/narrower wave patterns.

1. Fundamentals of Tone Production-

Buzzing -

Lips alone- Begin making sounds by buzzing lips without the mouthpiece. Although this is not quite the way the embouchure functions with the mouthpiece in place, it does help to train the lips to manipulate pitches without the aid of mouthpiece pressure while at the same time warming the muscles and enhancing blood circulation. The lip buzz, or free buzz, is also beneficial in developing embouchure strength without the aid of the trumpet or mouthpiece. For example, one of the reasons excess mouthpiece pressure works is that the player uses his arms to do what the lips should be doing themselves - compress and move inward towards the teeth.

To set up the free buzz the lips must be anchored on the teeth - not each other. Form an On the mouthpiece-

Hold the mouthpiece near the end of the shank with the thumb and index finger only (not all four fingers or a fist) in order to keep pressure to a minimum. Begin in the middle register (second line G) and work gradually toward the octave above and below (see *Mouthpiece Exercises*). It is helpful to begin buzzing without using the tongue to initiate the sound but just the air. Think of creating an open pipe in the middle of your body allowing air to flow freely through it from your lower abdomen and out across the lips. The throat should be open and relaxed, the tongue placed low in the mouth as if pronouncing the word “hope” or “Pope.” Notice that the P on the end of the word makes

your mouth even larger inside by pushing the tongue down farther and applying pressure against the cheeks. Another helpful image to use is a yawn or a sigh. *Allow* your lips to buzz as the air moves across them and out through the mouthpiece (remember we're not using the tongue to start the sound yet) keeping the embouchure as relaxed as possible at this point. Listen for a buzzy sizzle in the sound with just a bit of hiss or airiness. A lack of sizzle and openness in the sound indicates an embouchure that is pinched or too tense. Try not to press the air as it leaves your mouth, but rather allow your lips to *ride* on the moving column of air like water skis skimming across the lake. Practice buzzing both with the mouthpiece alone and with the aid of a *BERP™* or *Buzz-Aid™*. (Information for acquiring these tools is included in this packet).

Breathing –

The Two-Phase Breath-

During a large breath the whole torso expands - front-to-back, bottom-to-top, side-to-side. It is helpful to organize the expansion of the torso into two primary sections or phases. *Phase One* encompasses the lower portions of the chest cavity and, most importantly, the belly or waist. This is the area of greatest expansion drawing in easily 2/3 - 3/4 of a full capacity breath and is the easiest, most natural area to fill with air. *Phase Two* encompasses the upper chest and is a little more difficult to fill, because the small muscles between the ribs, the intercostals, must be stretched and the rib cage expanded. Although this area of the body holds relatively little air and is ill equipped for effective air support, it is essential that expansion occurs here in order to provide room for optimum efficiency of the moving air column. A full and expanded upper chest opens up the air passages and enlarges the air column for a more powerful flow without the use of excess muscle force. In order to facilitate this phenomenon a full breath must be taken from bottom to top, and the air must be moved out also from bottom to top using the lowest possible muscles of the lower abdomen (about where your belt buckle is) without collapsing the upper chest. A simple example of this, borrowed from Louis Maggio, is to think of a tube of toothpaste being rolled up from the bottom in order to get all of the product out. If the tube is squeezed from the middle, the sides soon touch and no more toothpaste can flow - even while more remains in the tube. The only way to keep the flow strong and full to the very end is to roll up from the bottom. Another way to think of this is to imagine a wedge - small at the bottom and large at the top. After taking a full breath, wedge in the lower abdomen, and allow the chest to billow up or inflate all the way up to the oral cavity. The idea here is to make the air column as large as possible all the way up to the lips while it is being moved along by some of the largest and strongest muscles in the body, the lower abdominals.

The benefits of a large air column can be realized in many areas of playing, both physical and aural. Sound, as our ears perceive it, is simply moving air. Vibrations or waves move the molecules of air through the space around us and into our ears where the vibrations are then converted into electrical impulses for our brains to interpret as various sounds. A large, dense, active air column translates into a large, dense and active sound. If the air column is compressed unnecessarily by a collapsed chest, a constricted throat, a tongue placement that is too high, teeth that are too close together, or lips that are too tight, the airflow will decrease in size and energy thus reducing both the amount and the

quality of sound. A large, active air column also makes the embouchure work much more efficiently allowing you to use less mouthpiece pressure and maintain a more relaxed setting which will in turn enhance the vibrations of the lips even further. A domino effect is set up, for better or worse, all based on the way you move the air in and out of your body.

Here is a simple exercise to help develop an awareness of the two phases of expansion and support from bottom to top: Sitting or standing with good posture, put one hand on your belly (not your stomach – that’s too high) between your navel and your belt buckle, and put your other hand on your sternum. Breathe deeply with your diaphragm pushing downward against your stomach and other organs. Allow your waist to expand (or “Get fat” as Arnold Jacobs would say!), and monitor this activity with the hand you have placed there on your belly. When this phase is complete you will feel full of air. This is *Phase One*. Next, fill your upper chest cavity, piling more air in on top of the big breath you just took. This is *Phase Two*. Monitor the movement of your chest with the hand you have placed on your sternum. Since the lungs actually extend from bottom of the ribcage to the very top, you should feel the coolness of the air in your upper chest and behind your collarbones that have just moved outward and slightly upward.

IMPORTANT: *Do not use muscles to move the collarbones or raise the shoulders!* It is the action of the air expanding the chest that will create this movement. We expand as a *result* of the inflow of air. Once you are full of air, both phases, bottom and top, blow the air across the room using the muscles below the navel to move the air up and out without collapsing the chest until the very end of the breath supply. Monitor this activity with the hands you have placed on your belly and sternum. One caution: although it is helpful to think of the inhale as occurring in two primary “*phases*” or areas of the torso, the breath is really a single event with air flowing smoothly and efficiently into the body, filling the bottom of the bag first and then progressively filling up to the top, then keeping the top of the bag open for unhindered flow while the large, flexible muscles in the waist area move the air up and out into the room. Practice this exercise regularly. It is helpful to begin with some sort of breathing exercise daily before you make your first sounds. This exercise can also be done while lying down on the floor on your back with your knees bent and feet flat on the floor. Put both hands on your belly with the ends of your middle fingers touching. As you inhale monitor the expansion of your torso with your hands and mentally scan your body making sure that you are not tensing any other muscles that are not involved in the respiration process -- larynx, shoulders, thighs, arms, etc.

Another simple exercise that can help encourage this full, two-phase expansion is to inhale and exhale through the back of a trumpet mouthpiece in time with a metronome. Set your Metronome to 60 BPM (beats per minute). Put the small end, or shank, of the mouthpiece into your mouth with the end protruding in past your teeth. Starting with empty lungs, inhale for eight counts, pulling the air in as quickly as possible. You should feel this working your diaphragm and intercostals as you fill up from bottom to top. If you are pulling the air in correctly you should be full of air by about the fifth or sixth count. For the remaining few beats continue to pile air in on top of what you have already taken in (it’s not very comfortable at this point!) being careful to keep your throat open. When the eight counts are up, blow the air out through the mouthpiece just as you

took it in – as quickly as possible, trying to get rid of all the air before the eight counts are up and then continuing to blow as if trying to collapse the lungs until the end of the count. Then, immediately turn the air around and inhale again the same way. Perform this exercise three or four times, and then remove the mouthpiece and take a nice deep relaxed breath exhaling in a sigh. This breath should feel substantially better and more efficient than the breathing you were doing before the exercise. While this mouthpiece breathing exercise is really a gross exaggeration (we should never perform with our lungs either this full or this empty), it is very helpful in expanding your limits and “warming up” or “lubricating” the respiratory tract for optimum performance. This is also a good exercise to begin the day with, especially if you are feeling tight or stiff in the chest.

Posture-

In order to facilitate effective movement of air for optimum tone quality, range, endurance, careful attention must be paid to posture, balance and tension. Problems with flexibility and accuracy can also frequently be corrected by adjusting posture and easing unnecessary muscle tension. Correct posture is more a matter of balance than of sitting or standing erect and rigid. Flexibility and lack of tension are primary goals. A phrase Arnold Jacobs often used was to “stand while sitting.” This will line up the spine, head and arms in such a way that there should be good balance and a comfortable feel. Some of the postural positions we commonly use such as slouching, slumping the shoulders, leaning back in a chair, crossing our feet and legs, tilting the head too far forward or backward, etc. actually create the need for more tension in order to hold the body in place. Excess tension deadens your tone quality, sapping resonance and projection from the sound and forcing you to work much harder than you need to. Tension in the arms, shoulders, hands, back, stomach, jaw, throat, face, and even your eyebrows can cause problems such as bad intonation, “cracked” notes, dull sound, poor endurance, and general discomfort while playing, and excess tension in any part of your body tends to spread to other areas as well until you find yourself tied up in a knot. For instance, excess tension in the stomach area will usually be countered by increased tension in the throat. Try tensing your stomach now. Feel the tension in your throat start to increase as a result. You may even notice your shoulders begin to tighten just a little, and as they do your biceps will also constrict slightly. Now try talking. Notice the small, dull quality of your voice. If you take a deep breath, relax your stomach muscles and shoulders and arms and speak again you should hear and feel a different, clearer, freer quality to your voice. This same phenomenon can be observed in your playing. An excellent resource for learning more about posture and balance is the *Alexander Technique*. There are many books on this method developed in the late 1800’s by F. Matthias Alexander who was himself a theater performer who overcame severe vocal problems by correcting faulty posture and eliminating excess tension.