

## ABSTRACT

McLaughlin, Clint. The Effects of Using the Cheek vs the Chin Muscles When Playing.

It is widely accepted that the smile embouchure causes problems when playing. Most nonprofessional players use the Zygomaticus Major, Buccinator and Risorius muscles of the cheek. Those muscles are used in making us smile. Some teachers use musical exercises called Buccinator Drills. That implies that those muscles should be used often. Conversely a great many professional players frown and use the Depressor Labii Inferioris and Depressor Anguli Oris of the chin. The purpose of this study was to document the differences between these two types of players and to provide evidence of which embouchure worked the best.

The methodology included the use of a thermal infrared camera, a decibel meter and a spectrum analyzer. A video camera was used to record all three of these devices as the subject played a multiple octave C scale. The heat patterns of the players showed the muscle area in use. The heat ranges from blue, green, yellow, orange, red and finally white hot. There were test subjects ranging from high school graduates up to players with Master of Performance degrees.

The smile players in these photos started out hotter in the cheek area on C4 than the frown players. The smile players only had 1 to 2 upper harmonics stronger than their C4. The frown players had 6 to 13 upper harmonics stronger than their C4.

A sudden flash of red in the cheek area of the subject caused the decibel meter to show a dramatic drop in power and volume. At the same time the spectrum analyzer would show a drop in the strength of the upper harmonics present in the sound. This flash of red indicated a sudden increase in muscle use in that area. The sudden heat changes in the smile players were usually when the player went from an open note to using valves while ascending. The frown players did not show the sudden heat change doing those note changes.

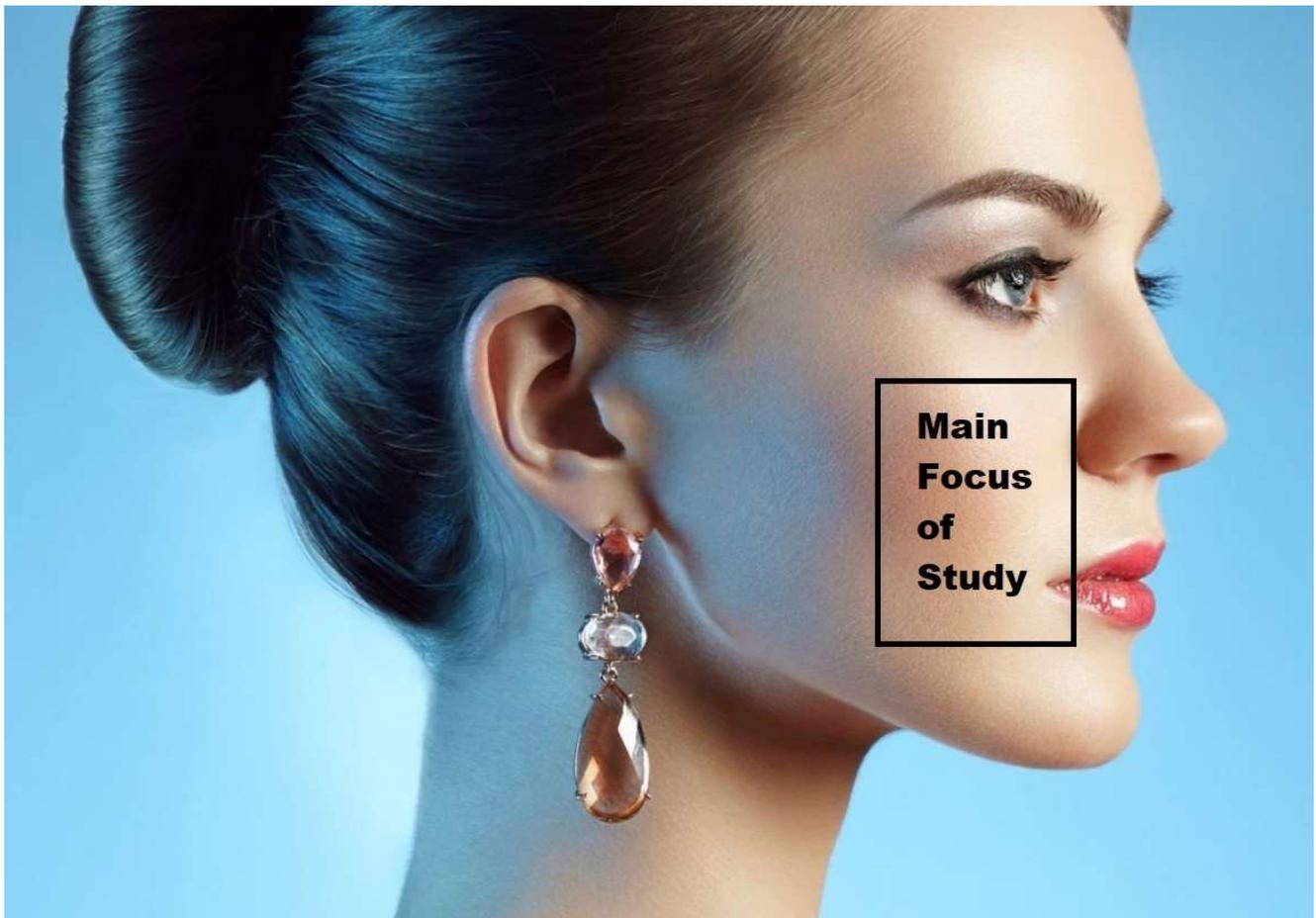
Conclusions were that the frown players had more range and resonance than the smile players.

It showed that players should concentrate on using the muscles that were within 1.5 cm of the lips and around the chin. This study should encourage teachers to teach a frown embouchure to their students.

Supporting photographs.

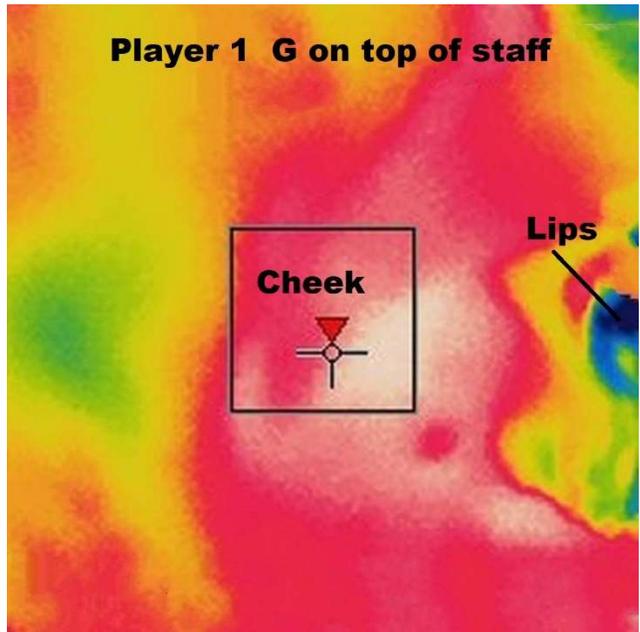
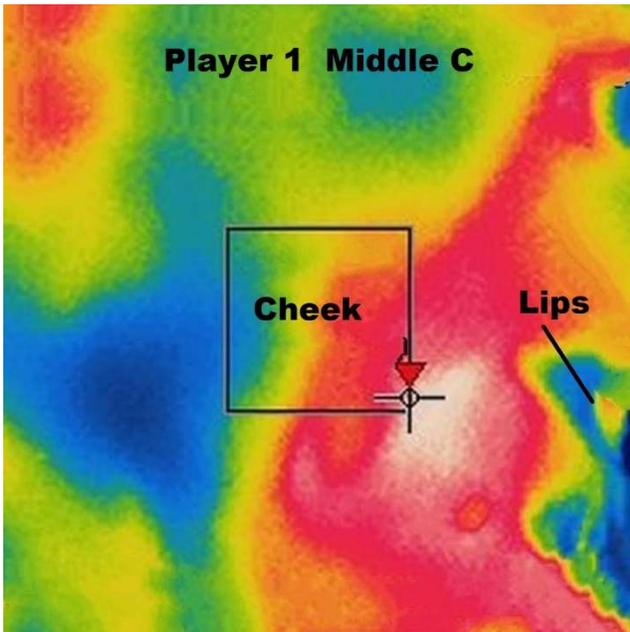
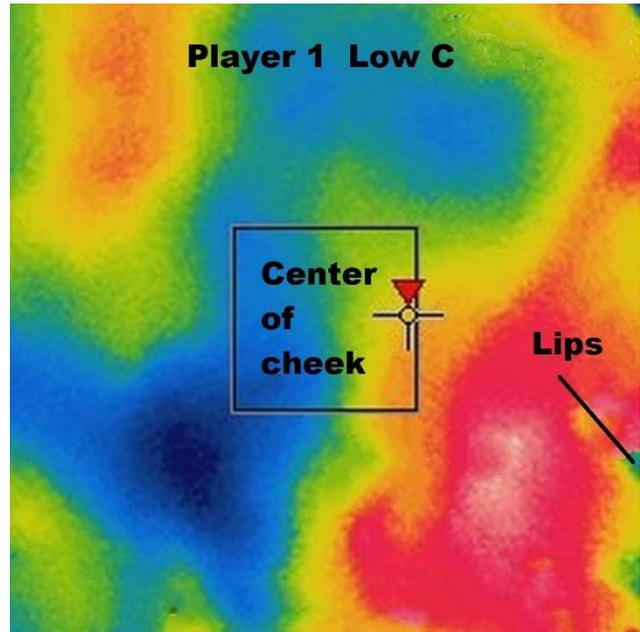
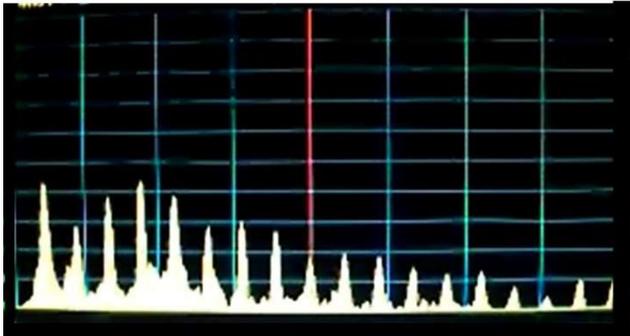
Still shots taken from video of 5 of my test subjects. 2 players had a range to G5 on top of the staff.

One player had a range to G6. One player had a range to C7 and one player had a range to C8.

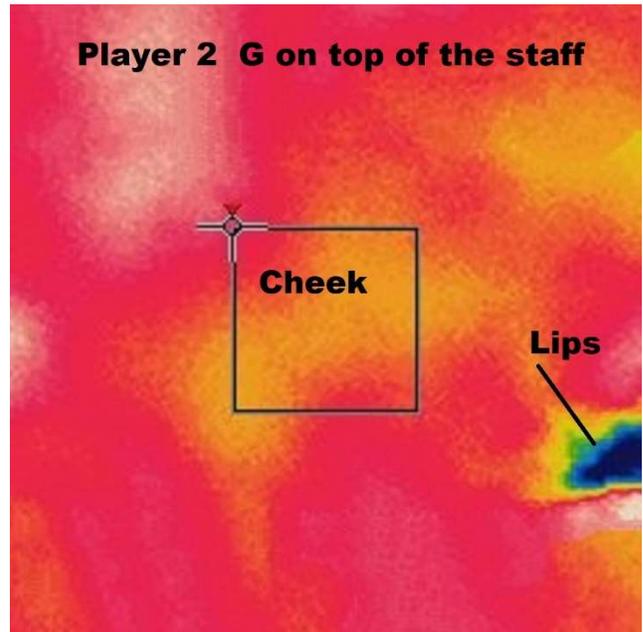
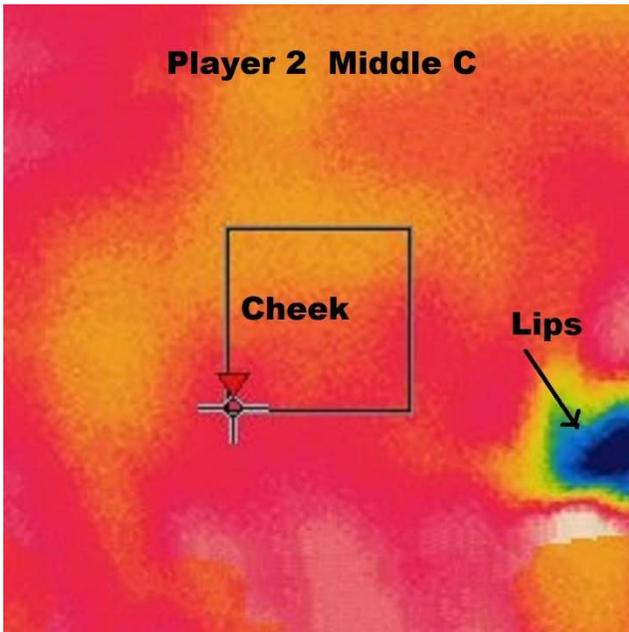
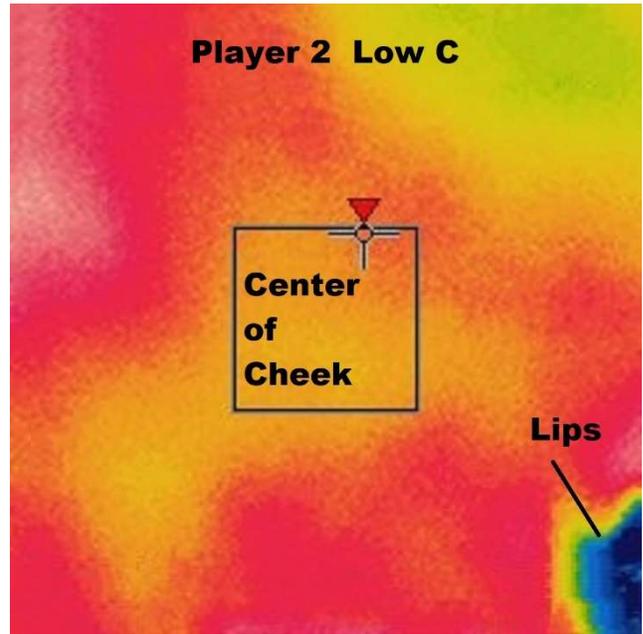
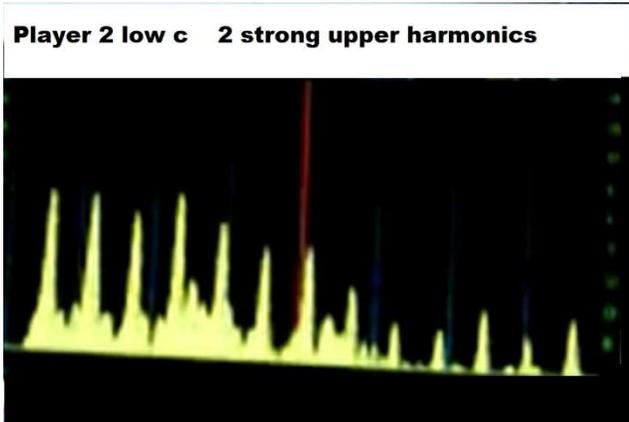


Player 1 uses cheek muscles to play.

Player 1 low c      1 strong upper harmonic

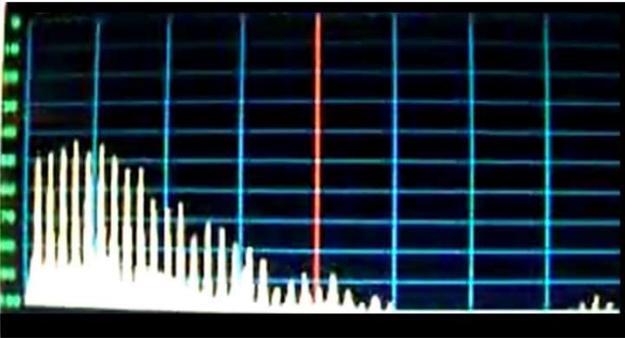


Player 2 uses cheek muscles to play.

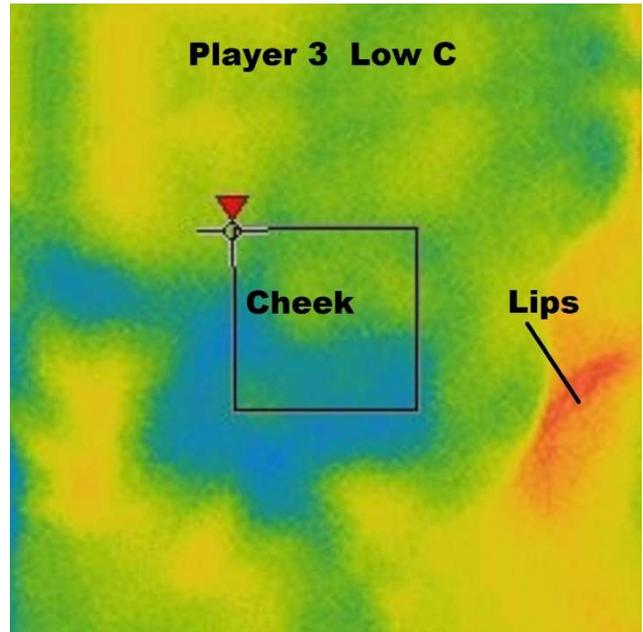


Player 3 uses frown and a little cheek to play.

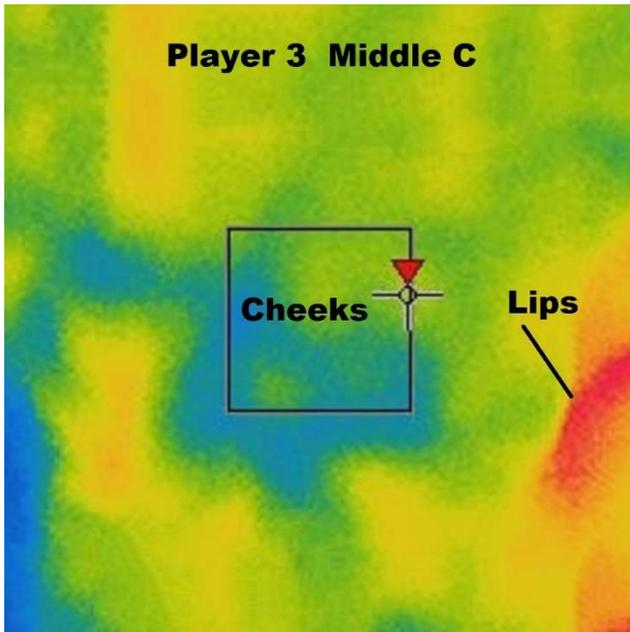
Player 3 low c 6 strong upper harmonics



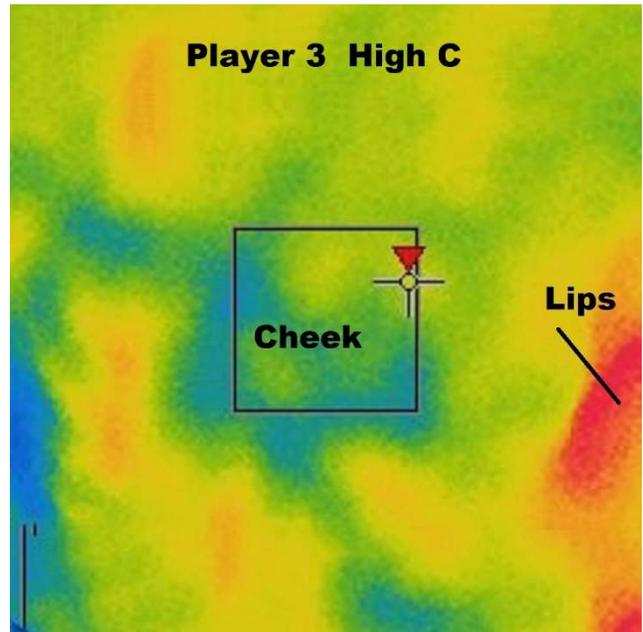
Player 3 Low C



Player 3 Middle C

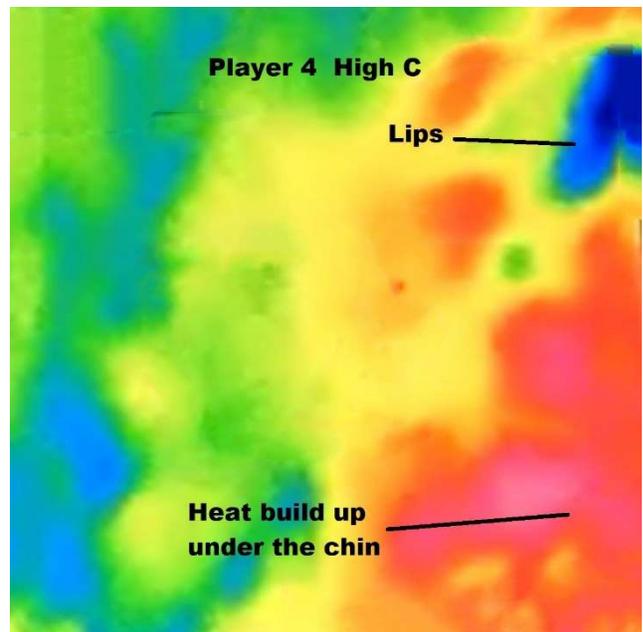
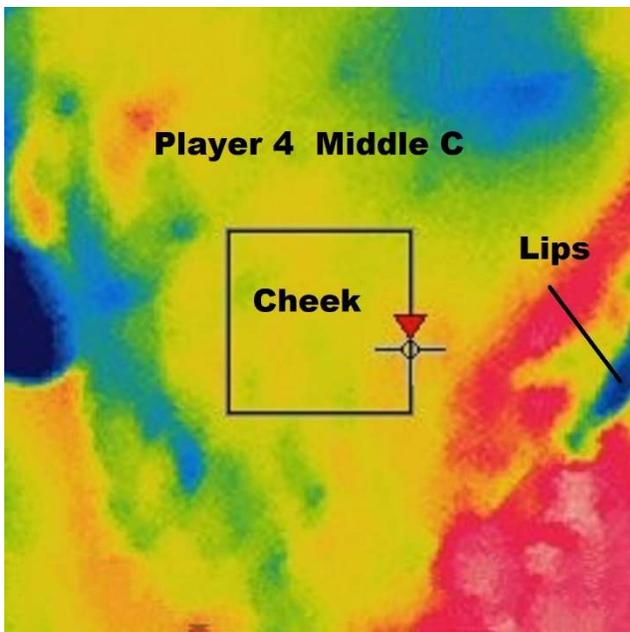
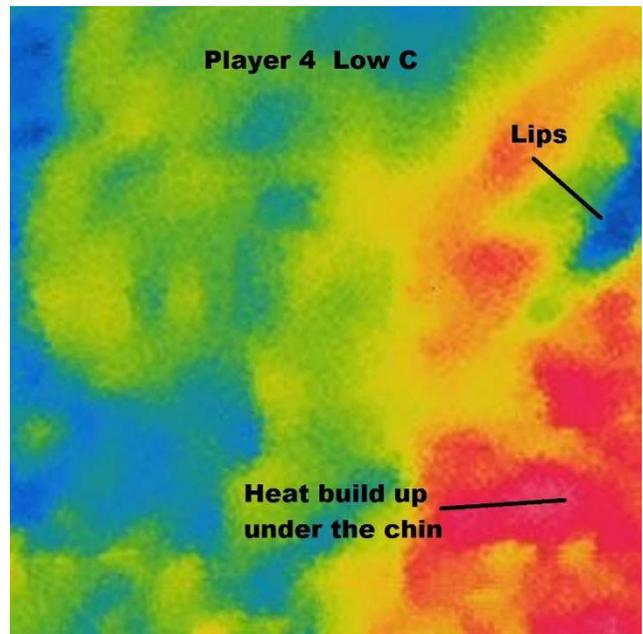
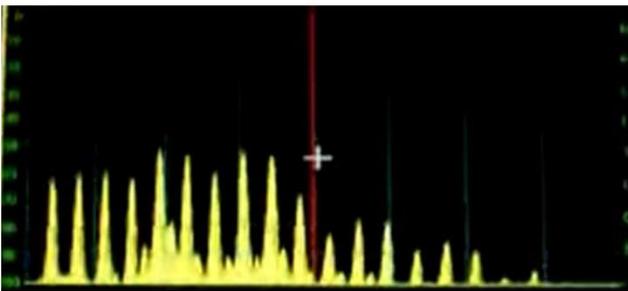


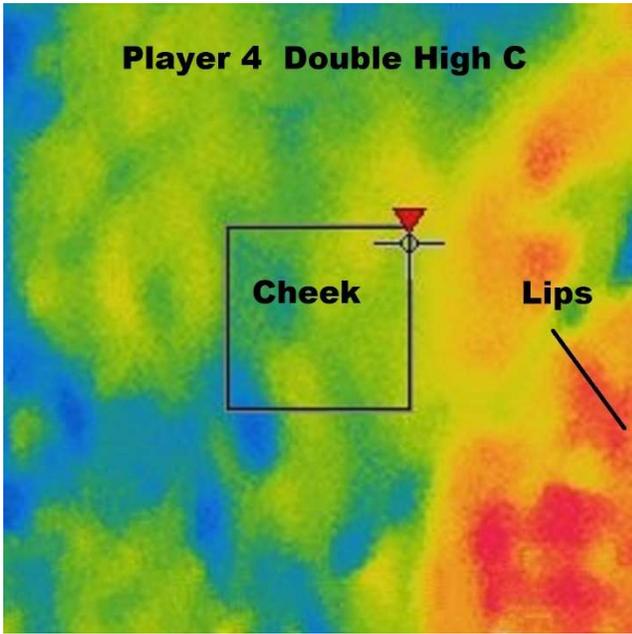
Player 3 High C



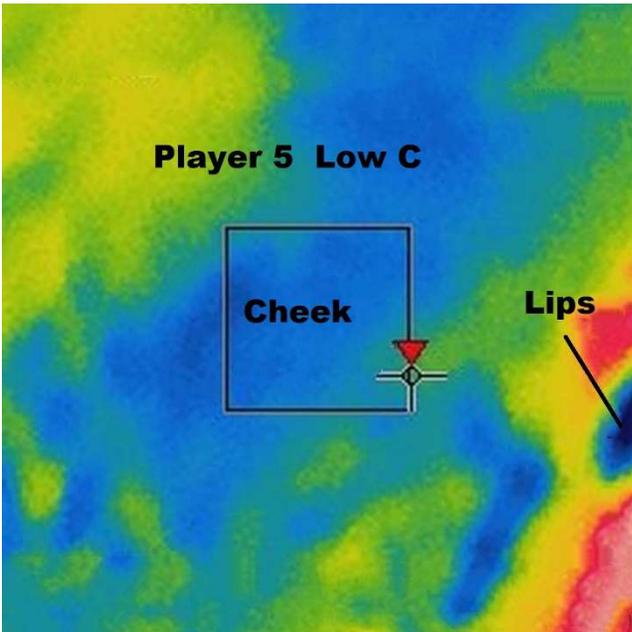
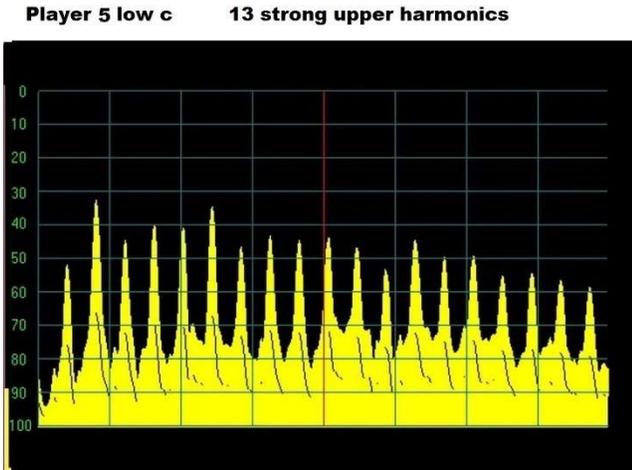
Player 4 shows the heat buildup under the chin of a frown player.

**Player 4 8 strong upper harmonics**

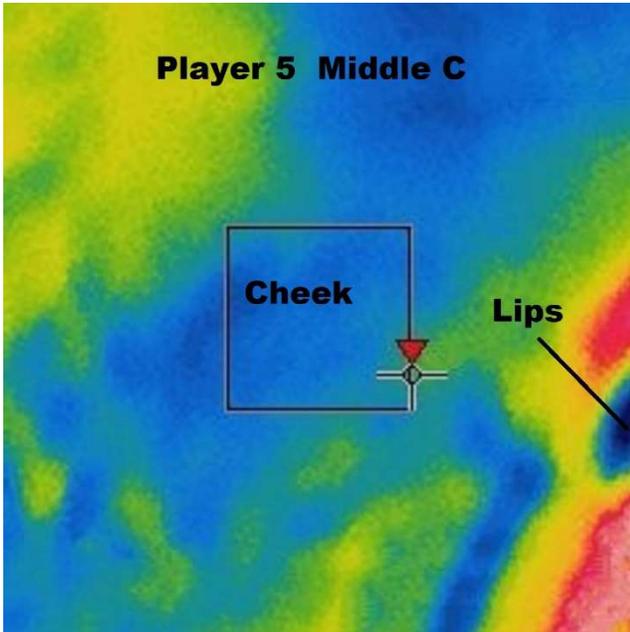




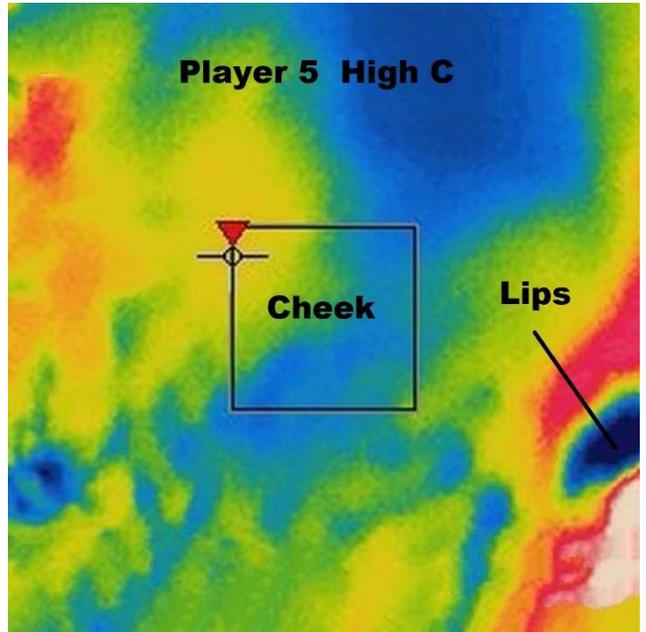
Player 5 uses frown and adds some cheek muscles from C7 to C8.



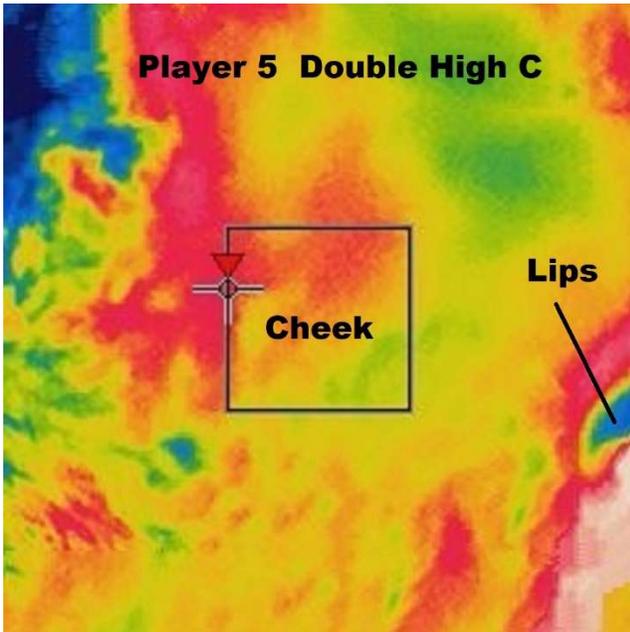
**Player 5 Middle C**



**Player 5 High C**



**Player 5 Double High C**



**Player 5 Triple High C**

