

# ANZCOR Guideline 13.6 – Chest Compressions during Resuscitation of the Newborn Infant

## Guideline

The normal newborn infant has a heart rate above 100/min once breathing has been established, usually within two minutes of birth.<sup>1</sup> The normal range of heart rate thereafter is 110 to 160/min.<sup>1</sup> In newborn infants cardiac output is rate dependent. If the heart rate is too slow the circulation will be inadequate to support tissue oxygenation.

### 1. Indications for starting chest compressions

Chest compressions are indicated when the heart rate is <60/min despite adequate assisted ventilation provided for 30 seconds (chest wall obviously moving with each inflation).

Because ventilation is the most effective action in neonatal resuscitation and because chest compressions are likely to compete with the performance and assessment of effective ventilation, resuscitators should ensure that assisted ventilation is being delivered optimally before starting chest compressions [Class A, expert consensus opinion].

Nevertheless, once compressions are started, they should be continued with as little interruption as possible until there is clear evidence of improvement in spontaneous heart rate [Class A, expert consensus opinion].

As soon as a decision has been made to perform chest compressions, preparation should commence to establish vascular access and administer intravenous adrenaline (epinephrine) (see ANZCOR Guideline 13.7).

### 2. Chest compression technique

Chest compressions should be centred over the lower third of the sternum (above the xiphisternum and just below the nipples)<sup>2,4</sup> and should compress the chest one third of the chest anterior-posterior diameter [Class A, extrapolated evidence<sup>3,4</sup>, and expert consensus opinion<sup>5</sup>].

ANZCOR suggests a technique using two thumbs on the lower third of the sternum, superimposed or adjacent to each other according to the size of the infant, with the fingers surrounding the thorax to support the back (CoSTR 2015, weak recommendation, very low quality of evidence).<sup>2</sup>

Usually the resuscitator faces the baby's head (figure 1), but in special circumstances, such as when access is needed to the baby's abdomen, this position can be reversed (figure 2).<sup>6</sup>

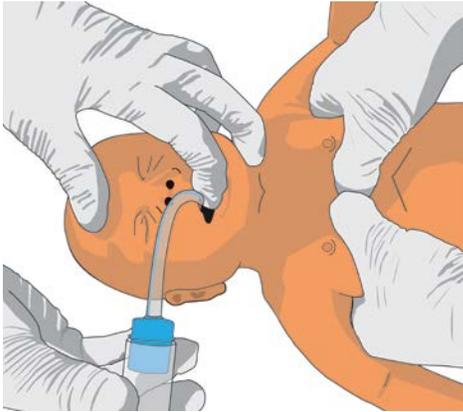


Figure 1.



Figure 2.

ANZCOR suggests the two-thumb technique over the two-finger technique because it achieves superior peak systolic and coronary perfusion pressure, provides compressions more consistently over long periods of time, and it is easier and less tiring for the resuscitator (CoSTR 2015, weak recommendation, very low quality of evidence).<sup>2</sup> The only circumstance in which the two-finger technique should be considered is when only a single resuscitator is available. [Class A, expert consensus opinion].

ANZCOR suggests that inflations and chest compressions should be performed with a 3:1 ratio of 90 compressions per minute and a half second pause after each 3<sup>rd</sup> compression to deliver an inflation (CoSTR 2015, weak recommendation, very low quality of evidence).<sup>2</sup> Compressions and inflations should be coordinated to avoid simultaneous delivery of a compression and a breath [extrapolated evidence<sup>7</sup>]. There is no compelling evidence suggesting a benefit to other ratios for the newborn. Since asphyxia is the predominant cause of cardiovascular collapse in the newborn, effective resuscitation requires significant focus on ventilation.<sup>2</sup> Continuous chest compressions at 120 compressions per minute without interruptions for breaths can be considered in the intubated patient.

The chest should fully expand between compressions<sup>8</sup>, but the rescuer's hands should not leave the chest [Class A, expert consensus opinion<sup>6</sup>].

### **3. Oxygen During Chest Compressions**

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Effectively delivered chest compressions will result in pulsations evident on an oximeter. As soon as chest compressions are commenced, it is usual practice to increase inspired oxygen to 100% if a lower concentration has previously been used. By the time chest compressions are deemed to be needed, then the steps of trying to achieve return of spontaneous circulation with lower oxygen concentrations should already have been attempted, and would have failed to increase the heart rate. Thus it seems prudent to try increasing the supplementary oxygen concentration. However, animal studies show no advantage of 100% oxygen over air in terms of return of spontaneous circulation in these circumstances and there are no human studies. ANZCOR suggests that if 100% oxygen is used then it should be weaned as soon as possible after the heart rate has recovered. (CoSTR 2015, weak recommendation, very low quality of evidence)<sup>2</sup>

Once chest compressions have been commenced, they should be performed with as little interruption as possible. Do not stop unless assessment is needed to make treatment decisions. Signs of improvement in spontaneous cardiac output may include improvement in spontaneous heart rate, a rise in oxygen saturation, and commencement of some spontaneous movement or breaths. Chest compressions should continue until it is obvious that the heart rate is >60/min.

## References

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