

Saliva Collection from Infants and Small Children

Studies have reported that some older preschoolers are able to donate saliva samples by spitting or drooling, (1,2) but researchers have generally found that using some sort of absorbent device is the best way to collect saliva from young children. Parents often have a better chance of getting the child to accept the device into his or her mouth, but even they may not succeed if the child is frightened, cranky, or overexcited.

Safety is an important issue when choosing a collection device to use with children, due to the potential for choking. For this reason, we advise that our own Salimetrics Oral Swab (SOS) – a 1 x 3 cm swab made of an inert polymer – should be used only for adults and children 6 years and older.

In the past Salimetrics recommended two devices that could be held by a parent or technician to insure that they were not swallowed by the child:

- Braided cotton dental rope. Although widely used in many studies for both children and adults, (3-6) cotton was not an ideal collection material, due to its unpleasant taste and texture, the difficulty of recovering the saliva and/or analyte from the cotton, and the fact that it causes interference with certain biomarkers, including testosterone, SIgA, estradiol, DHEA, and progesterone. (7,8)
- The Sorbette – a small, arrowhead-shaped hydrocellulose sponge attached to a plastic shaft. (BD Ophthalmic Systems Visipear, prod. no. 581089) The Sorbette was an improvement over cotton rope, with better overall recovery of volume and cortisol compared to cotton. (7) It has been successfully used in studies with young children. (8-11) At very low collected volumes, however, the volume recovered from the Sorbette could still be unacceptably low. (7) An additional negative point was that Salimetrics approved the Sorbette for use only when testing for cortisol, α -amylase, cotinine, and SIgA, since it caused assay interference for other analytes. Similar “eyespear” devices from other manufacturers have also been found to cause varying degrees of assay interference for cortisol determination, unlike the Sorbette, and they should not be used for saliva collection. (12)

An additional problem with the Sorbette was that it was difficult to tell visually how much saliva had actually been absorbed. (7) When inserted in the mouth, it would initially puff up, but in our experience it was necessary to leave it in the mouth for 60-90 seconds in order to be sure that an adequate amount was absorbed. Because the total capacity was limited (200-300 μ L), researchers often tried using two Sorbettes together at the same time in order to collect larger sample volumes. But even then, when the Sorbettes were sent to our testing service for processing, the volume of saliva recovered was often not enough to complete the testing procedure for some subjects, resulting in the unfortunate “QNS” (Quantity Not Sufficient) notation in the assay report.

Use of the Sorbette was also problematic when samples were to be tested for analytes that require expression of assay results in relation to saliva flow, such as SIgA and sAA. (13,14) Given its limited absorbent capacity, there was a real likelihood that the Sorbette would reach saturation very quickly when adequate saliva was

present in the mouth. We therefore felt that it was probably not possible to reliably estimate flow rates by noting the length of time it was in the mouth and weighing the device to determine the volume absorbed. (14)

Given the need for a child-safe collection device that works with a broader range of analytes and that collects a larger volume, Salimetrics has introduced two alternative versions of the SOS: the Salimetrics Children's Swab (SCS) (Item No. 5001.06), and the Salimetrics Infant's Swab (SIS) (Item No. 5001.08). These are made of exactly the same inert polymer as our SOS for adults, but they are manufactured in longer lengths, which allows one end to be held by an adult while the other end is placed in the child's mouth. The diameters of the SCS and SIS are appropriate for the size of the children's mouths, 8 mm and 5 mm, respectively. The polymer used for the swabs is very durable and can withstand chewing by the child, and its taste and texture are also acceptable to children. Like the original SOS, samples collected with either the SCS or the SIS may be tested for cortisol, cotinine, testosterone, SIgA, alpha-amylase, chromogranin A, and CRP. And, importantly, even at small collected volumes of 25-50 μ L, the recoveries of saliva volume and cortisol from the SCS are \geq 90 and 95 %, respectively.

After the SCS or SIS has been in the child's mouth for the desired length of time, some researchers prefer to cut free the saturated portion and to insert it into the Swab Storage Tube for centrifugation. Alternatively, the sample may be recovered by compression of the wet portion in a 5 cc needle-less syringe.

We advise that the entire swab can also be centrifuged or compressed if desired. In this case, the wet end of the swab should be inserted into the storage tube (or syringe), followed by doubling the dry end over into the opening, and finally using the cap (or plunger) to push the entire swab into the interior space. This procedure will allow the entire swab and storage tube to be weighed before and after collection of samples for determination of SIgA or sAA, in order to estimate the saliva flow rate during the timed collection period. The issue of the swab remaining in the mouth after the point of saturation is still a concern, however, and estimates of the flow rate and secretion rate will be inaccurate if the collection period is too long. (14) We therefore advise that some preliminary study should be done to determine the optimum collection duration for the type of subjects in the study.

A recent communication from a research group who used the SCS with 4-5 month old children reports that it worked well. The infants were allowed to chew or suck on the swab for 30-60 seconds, followed by mopping up any pooled saliva left in the mouth or on the face. The samples were then recovered immediately by compression in a syringe, and the procedure was repeated to collect more saliva if the initial amount was too small. When the samples arrived at our testing laboratory for testosterone analysis, most of the volumes were around 1 mL, and there were no samples with insufficient volume.

References

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