

Web-Based Radio Show

Regulatory Sensory Processing Disorders Part I


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Good morning. Thank you for joining us. Today we are going to talk about what we call Regulatory Sensory Processing Disorders. For those of you familiar with our DIR® Model and the different categories that we use, you will recognize this as regulatory disorders, but now with recent diagnostic classification we have enlarged on it to call them Regulatory Sensory Processing Disorders. Some colleagues refer to them as sensory processing disorders, you may have heard the term sensory integration disorders, which is not quite exactly the same, but has some similar features. Just to start off with a definition of what are regulatory sensory processing disorders, they are challenges that an infant, young child, older child, or even adults have in the way they deal with - that it involves taking in processing and responding to in terms of actions and motor patterns - different sensations such as sight, sound, touch, smell, sensation of ones own movement in space, and they also involve the response pattern – motor planning and sequencing, postural control, and the like.

Now these, we have all certainly seen children or we may have children if we are parents, who may be over reactive to things like touch or sound so a busy classroom might be overwhelming and we see a child hold his ears and huddle off into a corner. We see another child in that busy classroom get impulsive and strike out at another child. We see children in that busy classroom who are the opposite – children who crave sensation and bang into children and want more and more sensations.

We also see, as part of the regulatory sensory processing disorders, challenges in the way in which information coming in through the senses is processed. Children with auditory processing or language problems – they have a hard time making sense out of what is said to them, first in sounds and vocal gestures and then with words. It is hard for them to recognize patterns. Other




children have a harder time with organizing and making sense out of what they see so complex visual patterns may be hard. As a baby, they may see mommy's smile but not her eyes, nose, and smile together so it's harder to see the whole pattern of the face. Eventually they get there, but it takes them a little bit longer.

As I mentioned before, planning out actions – some children can only do, as a 16 month old, a one or two step action like moving a car back-and-forth. Other children can move the car into the tunnel, then look in the other side of the tunnel and pull it out and then do something else interesting with it like having it begin moving up in the air as if it were an airplane – particularly if you do it first and they are copying you.

So we will see very, very different patterns in the ways in which children respond to, make sense of different sensations and the way they take actions on the world of sensations. When you think about it, it is through the way in which sensations are taken in and processed and the way they are responded to and actions are taken that infants, young children, older children, and adults get to know their own body, they get to know their environments, they get to know the world they live in. It is fundamental for the child's sense of security. It is fundamental for this child to feel regulated. It is fundamental for performing, in a sense, one's own body because awareness in space and awareness of one self in relation to other people depends on this. So a child who gets up really close to you and invades your eye space or touches inappropriately may not be forming the kind of boundaries between people where they define themselves and they define others and they learn the rules of social interaction because they have a hard time within which they process sensation and plan actions.


We can divide these into many different patterns in our diagnostic manual, what we call the ICDL DMIC. We break them down into many subcategories. Broadly speaking, just for discussion purposes, we can think of the ways in which sensations are modulated, is the child over reactive, under reactive, or sensory seeking to the different sensations they take in; we can think of the ways in which they process or take in sensations, recognize patterns, and then interpret sensations – how well do they understand the words and then sentences and then whole paragraphs and reading comprehension at a higher level comes of that. How well do they understand complex visual designs? They can be over reactive to things like bright lights or colors and only recognize simple patterns, or they can recognize very complex patterns and even be able to reproduce them or change them like junior architects.



The third broad area is how they organize responses; how well do they plan actions and how well can they carry them out? Can they do a 10-step action plan, solve a difficult obstacle course, or are they limited to just one-step things where they bang a toy over and over again to hear the sound because that is all they are able to do. So we will see different patterns of motor planning and along with that we may see differences in coordination and muscle tone – some children having low tone and some having increased muscle tone. We are talking about categories that are short of children with real motor problems that are diagnosed in the cerebral palsy categories. Postural control will certainly be affected by muscle tone and by other factors having to do with different parts of the central nervous system like the cerebellum. Balance, coordination, and postural control all fall into the way in which our colleagues in occupational therapy and physical therapy assess the motor system and the way in which the child can respond to his or her world.

If you look at an 8 month old baby, you'll see that all of these systems have to operate smoothly together for that baby to begin developing a sense of who they are as a person – intentionality. So under optimal circumstances, you will see an 8 month old who is initiating interactions with their caregivers – hopefully mom or dad – big smiles, some vocalizations, mom vocalizes back, baby vocalizes with a big smile back, he or she may reach out to take a rattle from mommy's hand, mommy offers to take it back, he or she hands it back to mommy, and we get a back-and-forth interaction going. If we think of that, we can see how all the systems are working when the child hears her voice, sees her face, sees the rattle, doesn't overreact to it, doesn't crave it so much that they grab it or knock it over, mom doesn't have to energize up because the child is under reactive and use a really loud voice to get his or her attention. So they hear it, they see it, they coordinate that with a reaching pattern; a motor planning pattern, they look at mommy at the same time, they give her a big smile, coordinating three motor patterns at the same time, and they all evidence pleasurable affect; pleasurable emotion while they are doing it. They get pleased and excited without getting overexcited. So look at all of the things happening in that simple give-and-take. We see this ordinarily around 8 months of life. Some children won't achieve that until 10 months of life, but that is all of the systems working well.

When the system doesn't work well, any part of the pattern will not function in the way we would like it to. We may see all kinds of difficulties from a child not responding at all, to a child who cries and gets finicky because the voice




is irritating or a child who doesn't reach for the rattle and instead just flails their arms and cries because they might be hungry or wants to play but doesn't know how to express their desire to play. So we may see all kinds of different patterns emerging.

The regulatory sensory processing disorders or challenges can underlie difficulties with attention including ADHD and ADD, and can underlie also difficulties with controlling behavior, not being impulsive, aggressive, or destructive. It can also underlie various learning difficulties or disabilities like with reading, writing, or doing math. It can also underlie anxiety and problems with regulating mood and sometimes we see a lot of mood shifts in children with these types of challenges in their regulatory and sensory processing areas.

I should add just a side note – the reason why we call them regulatory sensory processing rather than just sensory processing is that they have to do with the way in which security and regulation are established as a foundation for all future development. In just a moment, I will share with you how affect or emotion is a key component of a child progressing in regulatory sensory processing capacities, i.e., not developing these types of disorders, or where the child has some tendencies in this direction, overcoming, to some degree at least, some of these kinds of problems. I should also add as a caveat, when I say that it underlies attentional problems and many language problems and many learning problems and many behavior problems and can underlie mood problems including anxiety as well as depression, I'm not suggesting it is the only contributor. I should also mention that we see this in children with autistic spectrum disorders. Most children with autistic spectrum disorders have regulatory sensory processing challenges as a contributing factor. And it is a contributing factor in many of these other kinds of problems as well, often not as intense as children with ASD. For some children, it is a more important contributing factor than for other children.


We are going to review how affect or emotion plays a key role and also how we can help children with these types of challenges. As we were discussing, the regulatory sensory processing disorders underlie many common problems from attentional problems to mood and anxiety challenges to behavioral problems. Let me give you a few examples of how that works before we go into the key role of emotion or affect and how we organize our senses and how we contribute to improving these sensory processing challenges.



Consider attentional problems – if the child is over reactive to sensations, they are easily distracted by different sights and sounds and touch, they may not overly react to it immediately, but they certainly notice it more quickly than others. So they have the opportunity to be very sensitive people and in tune with many aspects of their environment or highly distractible, looking from one place to another, jumping around. It could also contribute to their being impulsive – they get overloaded and scared – as I like to say, a cat’s meow sounds like a lion’s roar and they feel under threat so they strike before being struck. A child who craves sensations may bang into people and be aggressive or seem aggressive because they crave so much sensation and they want to be active all the time and they may invade other people’s body space to get real close.

A child who is under reactive may get lost in their own dream world, hardly noticing the environment around them and seem self absorbed because the people around them aren’t energizing up enough to attract them with their voices or their movements or their ideas, even though the child may be capable of responding. It may look like he has an ADD form of attentional problems, not the ADHD with the hyperactivity, but more the passive form where they daydream and stare at the tree outside. A child with sensory craving may crave so many sensations that he has to use behavioral problems and he looks aggressive or impulsive. A child who is over reactive to sound and touch may easily be more anxious. Mood swings are more possible because the child gets overwhelmed so easily that they can get hyper, and then if the environment doesn’t respond in a soothing way and people withdraw from them, they may feel lost and go into more sadness and later on experience a depression where they have a hard time feeling secure because they feel they are always losing the ones that they depend on the most.


Now we have discussed elsewhere the complex interpersonal interactions that can make some of these sensory processing patterns much worse, leading to anxiety, depression, or mood instability. A child who has difficulty with not just modulating sensations – not being over reactive, under reactive, or sensory craving – but who can make sense of sensations can easily have learning problems. So reading comprehension will be affected by auditory processing and language difficulties – making sense of what you hear; the sounds, the patterns, and eventually what you are hearing – what they mean. A child with visual spatial difficulties, which means making sense of what they see, seeing the complexity in the world, seeing patterns, certainly you would expect them to have a hard time reading graphs. The whole sense of quantity – something being



more or less than something, equating numbers with sizes and shapes has to do with how we see the world. Most of math underlies that. It is easy to memorize that $2+2=4$, but it is difficult to understand that 2 apples + 2 apples = 4 apples in terms of seeing it; seeing it as a pattern. That requires being able to see patterns. Now for those of us who do, it is hard to imagine those who don't. It seems so obvious. But for those who don't see the patterns – they see the trees but not the forest, that can be very, very difficult. That can underlie many, many math difficulties. Writing requires motor planning, particularly in the fine motor area. Sports or dancing require fine motor in the gross area, where you are carrying out many actions in a row. All of these can certainly be made more difficult when there are difficulties in these areas.

These are only a few examples. There are many more I could give you, but time precludes giving you all of the examples right now. What is important to recognize, however, is that these sensory processing patterns and disorders are important contributors to a range of difficulties. Take the extreme example of a child with ASD. If the world seems overwhelming to you, you may well withdraw from it. If that is compounded with auditory and language problems and making sense out of what you see – what we call visual spatial processing challenges, it is easy to understand why the world is not only confusing but hard to make sense out of and you may have trouble developing your own language and your own social interaction patterns and you may resort to or fall back on repetition, perseverative patterns if you have a good memory, just repeating what you hear, and then a diagnosis of ASD may be made. That might not be the only factor, but it may be an important contributing factor, what we are calling regulatory sensory processing patterns.

Now I mentioned before that we were going to look at the critical role of affect or emotion in all of this, and in just a second, we will do that. As we were discussing, emotions or affects have a key role in how regulatory sensory processing challenges and disorders develop. More importantly, and how we can help children, improve their capacities on the way towards overcoming these kinds of challenges. At our upcoming online conference, I should mention that we are going to have a special workshop on regulatory sensory processing disorders and go into this in more detail. But to understand the key role of affect or emotion, let's come back to what we call our DIR® Model, "D" standing for the developmental stages or what we call our functional emotional development like engagement, two-way emotional signaling, shared emotional problem solving, using ideas to label and be creative with emotions and being logical about




emotions and so forth, the “I” part in our DIR® which has to do with the different processing areas I have been outlining – sensory modulation, motor planning, making sense of sensations; and the “R” part – relationships with caregivers and teachers and anyone else who you interact with that we ideally tailor to the “D” and the “I” – to the way in which the child understands the world or interacts with the world and the different level the child may be at developmentally in terms of their functional emotional developmental capacities.

Now affect or emotion is a key part of both the “D” and the “R” and I’m going to show you that it is also a key part of the “I” – the individual differences; the way in which sensations are processed, and that is not commonly recognized.


Let’s take the image of a newborn baby in the first weeks or months of life just learning to look at mommy and focus on her wonderful voice or another caregiver such as a grandmother or daddy or a sibling, and just turn right or left or look up or down to look for that wonderful voice that is saying, “Oh, my sweet little baby, my little sweetheart, aren’t you adorable! What a cute little nose you have!” How does a baby do that? Well, routinely we see that baby in the first days of life turning his little head to turn to hear that wonderful voice to see that pattern that they may recognize around the mouth later as a big smile – later on they will see the whole face. Look what they are doing – they are seeing, they are hearing, and they are moving, all in a coordinated way, just by turning towards mommy. We see some babies do this easily in those early days and weeks and months, and other babies have a harder time with it. By three or four months, or even two months, the babies are breaking into big, robust smiles as they look at mommy and we begin seeing mouth movements that are imitating almost what mommy is doing, again responding to what they are seeing and hearing with movement of their own.

So we are seeing a number of systems, and if mommy is also stroking baby on the tummy or on the hand, they are integrating touch into this system. So they are integrating touch, sound, sight, and movement all in one harmonious hole. Now our hypothesis, which we call the “Affect Diathesis Hypothesis” – a complex, cumbersome term for something so simple, is that the pleasure in hearing mommy’s voice and seeing her face; or any other caregiver’s voice and face, and then the ability to move to find that face and see it some more as it moves left or right, that positive pleasant emotion is what motivates all of these senses – sight, sound, and touch – to work together and work together with movement. So it allows the baby to integrate what they are seeing, what they



are hearing, what they are touching, and probably what they are smelling too, and later on what they are tasting, with a movement pattern that allows them to have more pleasure and more delight in that voice. Where that affect is not pleasant; where the baby is hyper responsive to sounds and mom, dad, grandma, or the sibling doesn't figure this out intuitively that the baby needs a slightly lower-pitched voice or does better with daddy's voice than mommy's voice, or vice versa – does better with a high pitched, the families where this is not intuitive, and sometimes just through experimentation you see what pattern works to get that big delighted smile and that looking, we'll see the baby looking in the opposite direction sometimes, or not looking at all. Or maybe the baby has for physical reasons, problems with motor planning and they look past the voice and they might need more practice – eventually they will get it, if you are patient. But if you assume that your baby doesn't love you or doesn't want to talk to you or doesn't want to look at you and you shut down and stop giving that baby the extra practice, then that baby won't get what they need - that practice in using their emotions to coordinate all the senses.


Now part of our hypothesis is when the baby can experience that positive pleasurable affect, it organizes and coordinates the use of the senses. Now when this can happen, and in most cases does happen, in some cases it may require a professional consultation to help it happen, early in the game rather than later in the game – it is easier to get the baby back on the road earlier – when this can happen, we feel that it not only helps the baby from an observational point of view, bring or integrate or have all of the senses working together, and developing the senses because they are using them (practice makes perfect in this case or if you don't use it, you'll lose it, the notion goes) it not only helps the baby do that, but probably, and I say probably because we have seen this in animal work but we don't have overwhelming evidence for humans because the studies haven't been done yet, probably facilitates laying down the pathways, the neurological pathways that coordinate and integrate the senses. The most recent theories of autism, from the physical and biological point of view, is that it is not so much a problem of just one area of the central nervous system or brain, but it is a problem in the coordination or the pathways between the areas of the central nervous system or the brain. So we believe that there may be genetic and physical reasons that contribute to making it more difficult to form these pathways, but then it gets compounded by the baby who has a hard time interacting in the way we are describing. But if we can get practice in early, this is certainly what we do once we identify a problem, we use high affect states in the child's own natural interests to help the baby begin



coordinating their senses and engaging in the human world. We see progress by doing that. We think this helps lay the proper pathways down. Not only time will confirm this from a research point of view, but the reason why this has not been looked at in humans that much is because the technology to do brain imaging sometimes involves some risks that you don't want to do with a newborn baby. You certainly don't want to do PET scans and you certainly don't want to overdo some of the neuro imaging. But there are sophisticated techniques emerging that allow us to look at this, and soon we hope to have some evidence that this is exactly what happens in normal, healthy development.

The one thing we do know about human beings is – and our evolution has designed us to make this possible – what we do know is that the brain or the central nervous system is only very partially formed at birth. Evolution or Mother Nature has designed it so that most of our brain develops after birth and that experience with the world helps lay down pathways that we know pretty much for sure. So we are dependent on our experiences to lay down the proper pathways. This makes sense which allows us to adapt to different environments. So if we are in an environment that has certain sounds, we become more sensitive to those sounds and we can decode them more easily. Same thing with certain sights. So children who grow up in Asia are decoding different sounds than those who are growing up in America. Not that they can't learn Asian languages later or English later – you can – but it is easier for the brain to learn these from the get-go. So the brain seems to adapt to its environment and develop pathways consistent with the environment. That is why we feel this is so important in the role of emotion which is vital in integrating the different senses.

Let's jump again to our 8 month period of time when I gave the example of a baby beginning to get into a back-and-forth flow of interaction with caregivers where there is exchanging rattles, exchanging vocalizations, mommy makes a sound, baby makes a sound, mommy smiles, baby reaches for mommy's lips, mommy gives baby a kiss on the fingers, baby looks at his fingers, and we get that nice back-and-forth, almost like a dance. Here we call these circles of communication. Later, these will evolve into shared social problem solving where little Sally is taking daddy by the hand, looking at the toy up on the shelf, daddy gestures towards the toy, Sally reaches up for daddy to pick her up, daddy picks her up, she vocalizes with glee, she reaches for the toy and takes it, he says, "Oh my good little girl, do you want to play with it?" and Sally nods her head yes even though she can't say the word yes yet, and they get down on the floor and play




with that little toy. So here we have seen many back-and-forth interactions without using words yet, getting into what we call shared social problem solving.

Now when a baby goes from the 8 month level up to a back-and-forth communicator, always up to that 15 month level of that shared social problem solving, and both of these levels are a graduation from just simply responding to sensations or simply giving mommy a big smile and engaging with mommy which also involves affect, and all of these stages build on one another as we have seen elsewhere, what we are seeing is that babies have a capacity now to also control their sensory world better. For example, our 8 month old and 16 month old, when the voice is too loud, can give you a facial expression or a sound that indicates that it is too loud. So the baby instead of saying, “Oooooooohhhhhh, aaaaaahhhhhh!” in a pleasurable way, will go “Ooohhhaaaahhh!” as an 8 month old. Then you lower your voice a little bit and say, “Oh, what’s the matter, baby?” and he goes “ahh, ohh” and you hear a nice sound. A 16 month old can put his hand over your mouth as if to tell you to shush, as well as over their own ears as a signal to become more soothing. Our sensory craving 16 month old can be moving around, trying to jump, trying to touch, leading you to play obstacle courses or get a mattress on the floor where you can jump together or at least move together. Or you can offer to swing them around with the sound of their voice telling you to go faster or slower. They go “Ooohhhh, aaaahhhh, yyyaaaa!” or “woooaaahhhh” like that is too fast. So we see now back-and-forth communication with the baby where he is regulating their own sensory world by giving you feedback to what they like and what they don’t like.

Now this is a tremendous, tremendous boost to the feeling of getting overloaded or overwhelmed where all you can do is go into the fight-or-flight patterns where you get panicked and avoid or run away, or where you strike out or get impulsive, or where you just shut down and withdraw from the world. So we really have three patterns: the fight-or-flight, the withdraw, and shut down.

So as soon as the baby starts to be able to interact with emotional signaling, they can exercise control over their world. The more responsive caregivers are, the more that sense of control and mastery and that sense that “I can impact on the world” and “I can help my own sensory system,” the more that develops.

We don’t want to rush this, so what I am going to do is hold off until next time and take you through our different stages of development; our “D” and show you how at each stage, a child can make significant progress towards mastery of



their regulatory sensory processing challenges and we how have a number of areas we can really work on. We can use the “R” – the learning relationships to improve the emotional interactions and get to higher and higher levels so eventually a child can say to themselves, “Gee, I’m being overwhelmed; I better go out for a quiet walk.” They say that to themselves as a reflective judgment. So if the child can get to that point so they aren’t disregulated at all, even though they have a tendency to be over reactive, will show you how emotional progression through the stages will help a child do that – get to that point. Also, this will be a way of introducing the more direct work on the “I” part where certain exercises can help the baby actually improve the way they register sensation, the way they process sensation, the way they interpret sensations, the way they plan their actions, and control and coordinate their bodies. So we not only use the emotions in the “D” and the “R” part, the different levels of emotional development, and the different learning relationships, but it contributes to the “I” part, the individual differences, the degree to which the babies or children have these sensory processing challenges because some of that you are born with. Some of that you develop during early development, like if you are in an overwhelming environment, you are more likely to become sensory over reactive. But we can do direct exercises to strengthen the “I” part.

Thank you for joining us this morning.