

#TRENDS & GADGETS

## Health Monitor Wear & Forget It

Improving long-term biocompatibility and the long-lasting accuracy of wearable bioelectronics.



An ultra-soft 'skin-like' material that's both breathable and stretchable, could be used in the development of an on-skin, wearable bioelectronic device for health monitoring. Cancer, diabetes, and heart disease are among the leading causes of disability and death in the United States. A long-term, in-home health monitoring solution could detect these chronic diseases early and lead to timely interventions.

The new material could pave way for devices that track multiple vital signs such as blood pressure, electrical heart activity, and skin hydration.

"Our overall goal is to help improve the long-term biocompatibility and the long-lasting accuracy of wearable bioelectronics through the innovation of this fundamental porous material, which has many novel properties," says Zhang Yan, an assistant professor in the Chemical and Biomedical Engineering department and the Mechanical and Aerospace Engineering department at the University of Missouri.

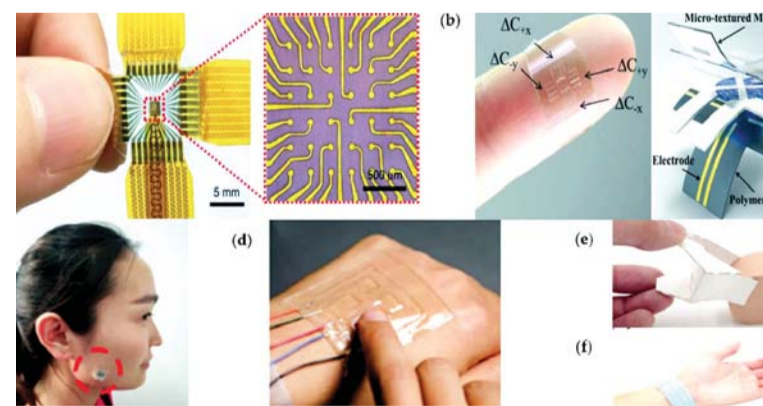
Made from a liquid-metal elastomer composite, the material's key feature is its skin-like soft properties.

"It is ultra-soft and ultra-stretchable, so, when the device is worn on the human body, it will be mechanically imperceptible to the user," Yan says. "You cannot feel it, and you will likely forget

about it. This is because people can feel about 20 kilopascals or more of pressure when something is stretched on their skin, and this material creates less pressure than that."

Its integrated antibacterial and antiviral properties can also help prevent harmful pathogens from forming on the surface of the skin underneath the device during extended use. "We call it a mechanical and electrical decoupling, so, when the material is stretched, there is only a small change in the electrical performance during human motion, and the device can still record high-quality biological signals from the human body," Yan says.

While other researchers have worked on similar designs for liquid-metal elastomer composites, Yan says that the University of Missouri team has a novel approach because the breathable 'porous' material they developed can prevent the liquid metal from leaking out when the material is stretched, as the human body moves. The work builds on the team's existing proof of concept, as demonstrated by their previous work including a heart monitor currently under development. In the future, Yan hopes that the biological data gathered by the device could be wirelessly transmitted to smartphone or similar electronics, for future sharing with medical professionals.



## AYENA: AN ACID TEST WITH A DIFFERENCE



*Ayena* is not a disappointing, frustrating story of five young women's lives, having been struck as if, with a bomb, which could have turned them into young women weeping in frustrating self-pity. It is a story of hope and optimism where these girls, taken care of by a NGO looking after acid attack victims, are given a meaning to begin life again. Ritu, without going in for plastic surgery, wears her terribly distorted face without either shame or embarrassment, and has also taken to modeling and walking on the ramp, which is shown towards the close of the film. Faraha, who adores her sister's little one, desires marriage and a normal life because she wishes to embrace motherhood. It does happen to her though, to begin with, she is quite sceptical about why a normal young man would choose to marry a young woman with a distorted face.



they patiently worked to reclaim their sense of self and rebuild their futures. Making this film also gave me an opportunity to be a listener, sometimes, with the camera, and sometimes, without it. The directorial intent of the film was to engage audiences on a human level, guiding them to rethink and reinvent the ways we identify with one another. With an intimate and delicate approach, I have tried to traverse the interplay between individuals' internal and external worlds. The film sought to explore the depths of these women's personalities, without elevating them to divine or reduce them to disability, bringing to light elements of their lives, their coming of age, redefining their relationships, and fleeting moments of carefreeness." *Ayena* is not a disappointing, frustrating story of five young women's lives, having been

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Siddhant Sarin has directed a brilliant film called *Ayena*, which means 'mirror'. It is a long docu-feature that focuses on five young women of different ages, who are victims of acid attacks that forced them to change the pattern of their entire lives. But the best part is that they are not cry babies and do not lament their 'bad luck' for no mistake of their own and are slowly, but surely, trying to reconstruct their lives without cribbing continuously about the sad joke that life has played with their lives.

*Ayena* won the Best Non-Feature Film Award (Hindi and Urdu) at the 70th National Film Awards, last year. The citation states, "An observational story of survival, told with compassion and sensibility, for intricately weaving shared experiences and offering an empathetic tale of resilience." *Ayena* (Mirror) explores moments of friendship, resilience, and the daily negotiations of two extraordinary Indian women, Ritu Saini and Faraha Khan. According to Sarin, "*Ayena* portrays how Ritu and Faraha meticulously navigated the intricacies of their daily lives. Despite an overwhelming sense of loss,

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or embarrassment, and has also taken to modeling and walking on the ramp, which is shown towards the close of the film. Faraha, who adores her sister's little one, desires marriage and a normal life because she wishes to embrace motherhood. It does happen to her though, to begin with, she is quite sceptical about why a normal young man would choose to marry a young woman with a distorted face. When she asks her mother for advice, she tells her not to marry, but after some hesitation, Faraha does get married with a life of music and dance and bonhomie that happens in any normal wedding. The scenes of the wedding, the reception, the music and the dancing add a lot of joy to the film which revolves around acid victims.

Director Siddhant Sarin has taken a very positive approach to these young ladies, who wear their distorted faces minus make-up and carry on with their lives as

if nothing has happened to them. He steers away completely from injecting the film with any kind of soppy sentimentalism or melodrama and this is one of the most outstanding features of the film.

There is a very touching scene where we find Faraha, briefly visiting her parents, leafing through the pages of an old picture album, with photographs of her before the attack. "I was very fat, then," she says and smiles, perhaps, a bit of pain audible in her voice. She lies beside her little nephew on a wooden, string woven cot as she gives a telephonic interview on her mobile. Ritu Saini, tall, svelte and with long hair, now has a terribly ugly due to the acid attack. She has nothing to do with the attack any more, though she rues the day she was attacked. Siddhant has successfully managed to redefine the very conventional meaning of the term 'beauty' as commonly understood by everyone. The girls are chatty, friendly, cheerful and have taken the attack in their stride, wear modern clothes like shorts and dresses, laugh and joke among themselves, and stick an invisible thumb at the world that refuses to accept them in their mainstream fold.

Acid attacks lie along the last-

### World Whale Day

Giants of the ocean are celebrated on World Whale Day, which aims to raise awareness of these magnificent creatures, their beauty as well as their ecological value to the planet. The annual day, World Whale Day, was founded in Maui, Hawaii in 1980 to honour humpback whales, which swim off the coast of this tropical island. This day was started as an idea by Greg Kauffman, founder of the Pacific Whale Foundation, to raise awareness about the threat of extinction faced by humpback whales.



all of them have to deal with greatly increased healthcare needs and the prohibitive cost of essential medical treatment. But in *Ayena*, we discover that the girls are indeed trying to cope with the changed real-life drama in their lives. Says Sarin, "Ritu's scars also brought her some fame. She occasionally finds herself talking on television, modelling at fashion events, or featuring in a Bollywood film. Still, she often feels lonely. She wants to be loved and embraces an ambiguous relationship with a fellow female survivor of an acid attack. On the other hand, Faraha has come to terms with her post-attack singlehood and her new lease of life. As she begins to enjoy the freedom and independence, a desire to become a mother slowly brews within her," explains Siddhant.

Most attacks are directed primarily at the face and result in terrible damage and distortion. The consequent disfigurement drives many victims underground in the face of ridicule and rejection, and makes it difficult for them to function in society. This film underscores the women's faces disfigured completely beyond recognition, but they are never shown crying over their changed destinies. They are trying their best to accept their lives as a challenge to be faced, fought and won, and the girls in *Ayena*, led by Ritu and Faraha, are proof of their courage, determination and optimism.

In 2020, Meghna Gulzar made a feature film called *Chapaak* based on the life-experience of a real life acid victim. The lead role of Malti was played by Deepika Padukone, who also co-produced the film. The film hits out at every concept and ideology about what we have been conditioned to understand as 'beauty' in a girl or a woman. Meghna Gulzar resists every attempt to reduce the life of the film's protagonist, Malti Agarwal into a soppy, sentimental, melodrama filled with self-pity and the hate and/or pity of everyone around her. Malti is a fictionalised story of acid victims starring a top actress. The USP of this film lies in the film's honesty in the way it explores the courage of the other victims, picked from real life, always smiling, singing songs through their crooked lips and non-existent noses, redefining the term 'beauty' for the female form in every sense of the term.

#SHOT AT



Once, when a girl goes to a shop and the salesman asks her what had happened, she says, "My husband threw acid on my face because I had filed a divorce case against him for severe domestic violence. He was jailed for three years and then set free and he married again." When the salesman asked her why she did not take further steps against him, she says, "What is the use?" Philosophically, Ritu says, "Not all men are vile and villainous. See, it was men who attacked us. Now, it is men who are taking care of us that we can walk back into our lives with self-respect," referring to the social workers in the NGO, which is not shown in the film.

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but-one spectrum of physical attacks on women and children. The last one being murder. But acid attacks, looked at in retrospect, are worse than murder because unlike murders, there is no closure for the victim. He/she lives on with the scars, physical and mental, that are never likely to heal because the medical infrastructure in the country is much less in supply than the demand, the expenses of plastic surgery are too prohibitive and the psychological scars remain forever. These victims will never smile again because their smiles are lost to time, forever. But are they?

On July 12, 2016, *The Telegraph* reported that the Calcutta High Court had issued an interim order asking the Bengal government to pay a compensation of Rs. 3 lakh to an acid attack victim within two weeks, the first such dole in the state. The order is in keeping with a 2014 Supreme Court verdict that stated that state governments

Another says that acid was thrown at her face by her own cousin who wanted to marry her, but she had vehemently refused the proposal. With few employers willing to hire people with such visible deformities, the majority find it difficult to earn a living even after they regain their capacity to work. At the same time, many are solely responsible for their children, and



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### #WORK-OUT

## For An Active Year

Five ways to avoid pain and injury when starting a new exercise regime.

Getting in the habit of exercising isn't easy. Not only is finding the time to exercise a major deterrent for people, the fear of aches, pain and injuries is also a reason that people put off starting a new exercise regime. But exercise doesn't necessarily have to lead to pain or injuries. Here are some simple things you can do to avoid them when starting out.

#### Warm-up

It's important to warm up before your exercise. Warming up raises the temperature of the working muscles and the whole body. It also prepares your body for the increased stress of exercise. Muscles that have been warmed up are able to exercise for longer, and suffer less soreness and reduced injury risk.

Exactly what constitutes an effective warm-up varies from workout to workout. But in general, you should dedicate at least five to ten minutes of your workout to warming up. Start with large, whole-body movements such as body-weight squats and lunges before progressing to a more task-specific actions, such as a walk or jog before running, or lifting light weights before weight training. Your warm-up shouldn't be too strenuous. Aim to use only about 40-60% of your maximum effort.

#### Don't Overestimate

A common mistake when starting a new exercise regime is to do too much. This can lead to pain after workouts, and may also increase your likelihood of injury. When you first begin a new workout plan, it's important to start gradually and at your own pace. Since everyone is different, avoid following an exercise programme that uses absolute distances or repetitions. Instead, focus on how you feel during a workout and listen to what your body is telling you.

It can take weeks or even months to notice the benefits of exercise, so, don't expect to see your health and fitness improve overnight. It's also worth noting that progress isn't always linear; some days, you may find that it's difficult to exercise as long or as hard as you did the previous session. Listen to your body and stop when you feel tired, to avoid injury.

#### Take Time to Recover

Taking a day or two off to rest each week is vital for recovery. But you don't just have to sit and do nothing for your recovery days to be effective. Active recovery is equally effective in



helping your muscles recover and helping you avoid pain and injury. Active recovery might include lower-effort exercises such as walking or yoga.

While aerobic exercise (such as running or cycling) doesn't usually require as long a recovery period as strength training, mixing up your exercises is still beneficial for avoiding injury. It will provide a more balanced workout and avoid poor movement technique, or form. Rotating between running, swimming, cycling or whatever takes your fancy will allow your body to recover and will help you achieve your fitness goals.

#### Learn Proper Form

Developing correct form early on is



important when starting a new exercise regime, to avoid developing bad habits. In the beginning, go slow, try a range of different exercises and don't add too much weight before you've nailed technique. Executing the movements properly will help you avoid injury.

If you choose to exercise at a gym or fitness centre, ask a trainer for pointers if you're unsure about your form. If you prefer to work out alone, there are lots of resources available online to guide your training. You might also consider filming yourself so that you can see how your form looks.

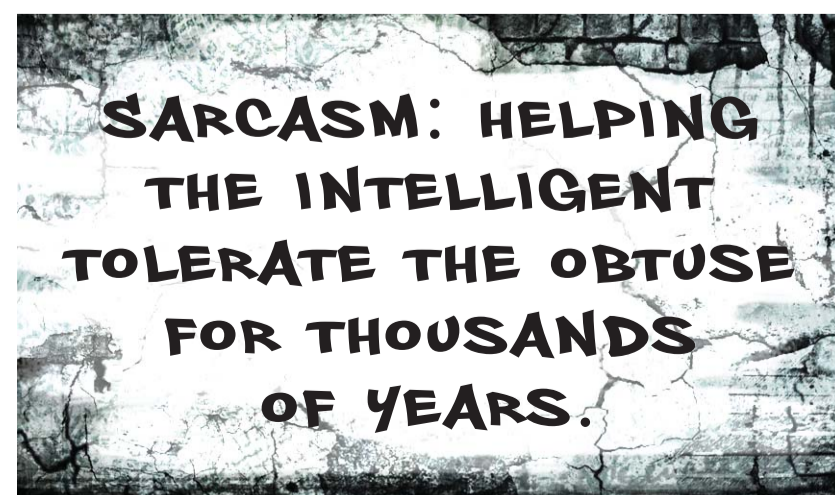
#### Invest in the Right Shoes

The right pair of shoes can make all the difference to your workouts. It's particularly important for running, as comfort and support will help reduce soreness and make your runs more enjoyable. You don't need an expensive shoe either, just one that provides appropriate support for your unique gait, which will help protect vulnerable areas of your feet from overuse injuries.

Don't let the fear of pain or injury put you off from starting a new exercise regime. The benefits of exercise far outweigh the temporary feeling of muscle soreness that can accompany a new exercise regime. Not to mention that as you make exercise a regular habit, you're less likely to feel sore after each workout.

While you should take at least one day off between strength training workouts, another strategy to boost recovery is to work different muscle groups on different days.

### THE WALL



### BABY BLUES



By Rick Kirkman & Jerry Scott

### ZITS



By Jerry Scott & Jim Borgman