



How Dermatology Failed Me

***Corresponding Author(s):** Sydella Emily Lily Nahama

Queen's College, London Harley Street London, W1G 8BT,
UK.

Tel: +447568578897; Email: sydellannahama@icloud.com

Abstract

In this article I will be reviewing my personal experience with acne and the wide range of treatments I have received, which includes multiple antibiotics, spironolactone, numerous topical creams, holistic remedies, the contraceptive pill, Roaccutane and not to mention the numerous specialists I have seen. My acne journey has thus far lasted over three years and I believe it is the right time to share my experience to let people know they are not alone. Acne is an isolating disease, psychologically detrimental and although it feels as though my difficult journey is unique, I sadly know this is not the case. I offer insights scientifically on the aim of each treatment and why they did not work for me and the psychological effects this led to. These have been considerable and overwhelming at times, and I decided to redirect this negative energy to something productive and have spent hours researching the science behind every aspect of my acne journey. My hope is that I will be able to improve and accelerate the treatment of others, empower patients and help healthcare professionals understand the patient's perspective better.

Received: Apr 27 2023

Accepted: May 11, 2023

Published Online: May 18, 2023

Journal: Journal of Case Reports and Medical Images

Publisher: MedDocs Publishers LLC

Online edition: <http://meddocsonline.org/>

Copyright: © Sydella ELN (2023). *This Article is distributed under the terms of Creative Commons Attribution 4.0 International License*

Introduction

As a 17-year-old girl with severe acne, it feels as though dermatology has failed me. I have been to three different dermatologist and an aesthetic specialist, read numerous dermatology articles, received loads of homeopathic and home remedy advice, and listened to countless reassuring comments that "it will all be okay". Over a year has passed, I am still in pain and the scarring looks irreversible. I am out of patience. I had always thought "it cannot get worse", but every single time, to my surprise my acne got worse. It reached a point where I needed to take Nurofen for the pain of my face to get me through the day. I was and am extremely self-conscious, embarrassed and in pain. Acne has dominated my thoughts and, at one point, became my whole identity. Maybe it is vain and lacks real-world perspective, but the psychological effects of acne are significant. Although acne is the eighth most prevalent disease globally [1], it feels as though no one truly understands the struggle and has an effective, consistent treatment approach. This personal crisis has motivated me to take control of the situation and understand the science and psychology behind acne. My hope is that I will be able to improve my treatment and the treatment of other teenagers.

Firstly, acne is actually called Acne Vulgaris Disease. Anyone can hear the word "vulgar" in this name, which creates undertones of grossness or disgust relating to the disease. This is how it feels to have acne; some days I felt ashamed, as if it were "vulgar". But it turns out "vulgaris" translates to "common" in Latin, which is a juxtaposition from its sound. It is ironic. I think acne is a disease that, despite being common, each patient has a unique, difficult journey. Acne is a skin condition that occurs when hair follicles are blocked with dead skin cells, bacteria and oil. These blocked follicles cause lesions on the skin. A class of hormones called androgens (sex hormones) increase the sebaceous glands' production of oil which increases acne [2]. The bacteria associated with acne is called Propionibacterium Acnes (P. Acnes) which prefer anaerobic conditions, therefore the increase in sebum better creates an environment for them to reproduce and cause acne.

The Beginning of the Journey

I had always been a spotty teenager, but nothing out of the ordinary. In 2020, my GP prescribed me Duac (once daily) which is a topical cream with benzyl peroxide and clindamycin antibiotic, and it works as an antiseptic to the P. acnes. It seemed to



do the job when I was thirteen years old.

In May 2022, I was referred to a dermatologist since I had developed severe acne on my back with mild acne on my face. We started with the first oral recommended treatment for acne by the NHS. I started erythromycin for a month, followed by tetracycline when the effects of the erythromycin quickly went away. These antibiotics are broad-spectrum and treat a wide range of infections like cholera, pneumonia and malaria.

In terms of how they work, erythromycin diffuses through the bacterial cell membrane and binds to the 50s subunit of the bacterial ribosomes (macrolides) whilst tetracycline binds to the 30s subunits (tetracyclines). Tetracycline and erythromycin both prevent bacterial protein synthesis so are called bacteriostatic (prevent further growth) and erythromycin can also be bactericidal (kills the bacteria) [3].

This will damage or kill the *P. acnes*. I researched how *P. acnes* can cause acne and usually *P. acnes* ensures your skin maintains homeostasis, but in the presence of excessive sebum it causes acne by irritating the lining of the pore or hair follicle [4].

Whilst I had seen subtle improvement to my skin (**Figure 1**), I believe this was mostly because I was laying in the sun four times a week during the summer. Perhaps the antibiotics never truly helped me? Topically, I was using Epiduo (0.1% adapalene: 2.5% benzoyl peroxide) which did help improve my back acne. The adapalene is a retinoid which increase cell turnover and shedding of corneocytes on the outermost layer of the epidermis. Whatever it was, antibiotics, cream or sun, the impact was short-term, and the acne came back as I will describe below.

Whilst taking these antibiotics, I kept on hearing from my parents and friends that I needed to get off them because they are bad for my gut. Antibiotics impact the quantity of bacteria in the gut which negatively impacts bacteria diversity and causes dysbiosis (imbalance in gut microbial community) [5].

Moreover, the overuse of antibiotics also can cause overgrowth of pathogenetic microorganisms. This can cause bacterial infections because the removal of large quantities of bacteria results in decrease of commensal bacteria due to the interdependence of microbes in the gut. In 2023, the UN reported that antibiotic resistance causes 1.27 million death per year due to the "superbugs" [6].

Another con to antibiotics is that the resistant strains usually multiply. I am a primary example of how patients are overprescribed antibiotics and due to not doing a full course, antibiotic resistance occurs. The aim of the antibiotics killing *P. acnes* does not work anymore. This is when I would see the effects of the antibiotics fading. My face is apparently antibiotic resistant.

It seems the overuse of antibiotics can also cause yeast infections in women by killing the beneficial bacteria in your vagina which usually maintains a slightly acidic environment which is not optimal for yeast. Critically, this bacterium controls the growth of yeast in the vagina, and with its shortage, yeast can grow uncontrollably [7]. I was told this is another issue with antibiotic treatment that I should be wary about.

The lack of real change in my acne symptoms and constant warnings from various professionals, friends and family resulted in halting this treatment path. After 8 months of a range of antibiotics, I still have loads of left over medication.

It Takes a Turn

After summer 2022, going into my first year of A-Levels, my stress increased, and I was told by multiple health care professionals that stress would make my skin worse (**Figure 2**). This had me stressing about stressing about my skin... a vicious cycle that I still haven't broken. I started doxycycline for 2 months in November 2022, which is a second-generation tetracycline which offers lower potential for food-drug interactions [8].

I became motivated to understand how stress causes acne. What I found out was that stress increases adrenal androgen secretion by increasing ACTH secretion in the pituitary gland. This has a lot of effects and can stimulate cytokine production which in turn increases growth and increases activity of the sebaceous glands (which increase cell proliferation and lipogenesis) [9]. This increases the activity the sebaceous glands, so the glands produce too much sebum, thus irritating acne.

Of course, stress has other negative effects; it impacts gut health, which in turn impacts the skin microbiome. After research I found the autonomic nervous system and endocrine system carry distress signals to the gut which causes inflammation. This triggers bacteria that encourage dysbiosis in the gut [10]. It is obviously much more complicated than this, but the gut-skin axis demonstrates the correlation between skin and digestive system. This is because dysbiosis allows pro-inflammatory molecules to escape and enter the bloodstream [11]. These molecules reach the skin where they trigger inflammation that causes acne flares. Basically, any form of stress will link to an acne flare. (**Figure 3**) Not great.

After having been on antibiotics for over 8 months, I tried spironolactone which is a potassium-sparing diuretic which works by stopping aldosterone (made my adrenal glands) from working in part of the kidneys which changes the salt and water balance in your body [12]. I read that this inhibits androgen-induced sebocyte proliferation which potentially inhibits sebo-genesis by reducing sebum secretion [1]. Hair follicles are very sensitive to androgens. This medication is more of a hormonal approach to solving acne, which I knew was primary my type of acne as a teenager.

Spironolactone is not approved for acne treatment, but it has been used off-label for acne treatment since the 1980s [1]. I was told this before taking it, which of course worried me, but I was also told that for some people they saw an improvement in their acne. By this point my acne had started becoming deeper (meaning the infections are deep within the follicles) which I had never experience, so I was willing to try any new medication. I was over the antibiotic game in November 2022.

Spironolactone helps control hormonal acne in 60-65% of women. It only works whilst you take it, meaning that when you are not using it, the acne may come back. Since it is a diuretic, passing urine is a lot more frequent, which I experienced. Moreover, it can cause menstrual irregularities due to the suppression of androgens; LH and FSH are suppressed which play a key role in the menstrual cycle [13]. I had spotting between my periods and significant period latency, which was rather scary. I had never experienced this dramatic irregularity of my period. The combination of seeing my skin get progressively worse and a new fear for my longer-term fertility, I decided to stop spironolactone.

During this time, I had stopped using the Epiduo cream and moved towards a 2% salicylic acid cleanser and solution. In

hindsight, I was so frustrated that I cleansed my face and used the solution too much. The acid works by inducing controlled chemical injury to the epidermis to prompt rejuvenation. It does so by inhibiting the formation of comedones (black or white heads) and removes intercellular lipids which decreases sebum secretion [14]. My misuse of the product stripped my skin from its natural oils which are necessary as a barrier to the external environment which probably caused more breakouts.

The Unknown

January 2023 was a hard month. Whilst I was figuring out what the next steps should be for my skin, I kept on taking some left-over erythromycin and then doxycycline when the erythromycin ran out, in hopes they would manage my acne for the time being. My mother suggested we should do a blood test to check my hormones and whether I had Polycystic Ovary Syndrome which is a condition where women may not ovulate, have high androgen levels, and have many small cysts on their ovaries [15]. The irregular periods hinted towards this, as well as the acne. But sure enough, all my androgens were at normal levels; the spironolactone caused the irregular periods, and it was becoming clearer to me that my acne is unluckily genetic (my dad had severe acne as a teenager as well). There is comfort in knowing that someone who loves you went through the same thing, however it also creates resentment. When everyone around you has finished their acne prone years and look at my skin and say "it will be over soon" it feels as though I am punched in the gut. I know it will be over one day, but we are in the present, and my feelings are in the present. I want to be able to go outside again and not cover my face with makeup or feel embarrassed. It takes a toll of you.

As my acne kept getting worse people would look at me and say, "how is your diet?". This is the phrase that is the hardest to hear. It comes to a point when your acne is not just black heads and white heads, but deeper pimples, nodules and pustules, when you realise diet, face masks, chemical peels or facials cannot solve the issue.

I am intolerant to gluten, dairy and don't eat red meat which means my diet has always been better than the average person. I have always enjoyed my fruit and veg! It is hard when people assume I have a bad diet since my skin is not clear. People think you are dirty and unhygienic but, it was the luck of the draw of getting my dad's genes. There is evidence that diet does affect hormones by increasing cortisol levels (androgens) which affects the sebaceous glands, so more oil is secreted which we know leads to acne. Nevertheless, for my situation, my diet had nothing to do with acne!

The next step in treating acne in the UK is the combination oral contraceptive pill for women. At the end of January 2023, I started Yasmin which is a contraceptive pill that uses a higher dosage of oestrogen (ethinylestradiol) combined with a man-made form of progestin called drospirenone (which is anti-androgenic). It is important that the progestin is anti-androgenic because usually synthetic progestin is androgenic [16] which the sebaceous glands are sensitive to, so this leads to acne. Oestrogen has the opposite effect on sebum production by preventing the ovaries from making androgens [17].

I have been on Yasmin for 3 months now, and once again there is no improvement to my skin; it just keeps on deteriorating (Figure 4). Not to mention I am noticeably more emotional. I will stay on the contraceptive pill anyways since it helps with

my painful periods. A week after starting Yasmin, I saw another dermatologist... by zoom. In hindsight, no dermatologist should be able to do their job over zoom. I was taking anything that was available. She told me that it is all stress, and I should keep doing what I am doing: taking Yasmin and some left-over antibiotics. In hindsight, that was a concerning consultation.

I then reached a point when I was fed up with everything. The physical pain of my skin was distracting me in class. I couldn't look at myself in the mornings. Everyday ended with me bawling my eyes out and popping another Nurofen to be able to sleep. I felt peoples' eyes wander around my face as I talked with them. I didn't feel like I was myself, as if people couldn't see me properly (Figure 5).

During these hard times, people would give homeopathic or holistic advice. I was told drinking loads of water would help. Have a glass of celery juice in the morning. Some would say it is all mindset, and that I could cure my own acne by thinking I had clear skin. It does make me angry to hear these comments as if I was being lazy for not "manifesting" clear skin. While much of this was well meaning, it was horrible advice.

On the other hand, it is strange because sometimes I found myself believing these comments. I think this demonstrates how desperate I was. There would be a split second where I could imagine life with clear skin and that it was coming. It was nice to think this. But then I would look at myself and remember that I don't actually have clear skin and that it will take at least 3 months to see any sort of change. Instead, I have learnt that how someone with acne chooses to perceive themselves the moment they wake up is pivotal (Figure 6). Mindset is crucial, especially when you are on the contraceptive pill.

A Potential Breakthrough?

Finally, at the end of February 2023, I visited a dermatologist who I knew would prescribe me Roaccutane. I never wanted to get to this option. No one does. I had always been reluctant to try Roaccutane because of the mental effects associated with it. But when your mental health is crippling due to the acne on your face, it makes you wonder if the mood issues associated with Roaccutane would be as bad as life with severe acne.

Typically, Roaccutane is prescribed 0.5mg per kilogram of body weight per day. For me this would mean the starting dosage would have been 30mg. But I was started off at 5mg. Frankly, I was grateful someone was looking at my skin and telling me the truth. The dermatologist even criticised my mother for letting other dermatologists play around with my skin and wasting precious time. He knew I desperately needed Roaccutane but that I also needed to take it slow due to the inevitable mood changes.

Roaccutane (isotretinoin) works by causing a significant reduction in sebum production, which reduces comedogenesis (the accumulation of corneocytes on the outmost layer of the epidermis in the sebaceous duct) by reducing hyperkeratinisation (keratinocytes of the hair follicle don't shed normally on the surface of the skin which causes microcomedones) which therefore lowers P. acnes. How this happens... no one knows the exact mechanism. Isotretinoin has no intentional antimicrobial action, but the reduction in the sebaceous duct creates a less favourable environment for the colonisation of P. acnes [18].

I was also prescribed prednisolone (a steroid) for the first

month of Roaccutane. This is because usually when starting Roaccutane, severe acne flares can occur (no one knows why) so steroids are used to reduce the initial inflammation. I started at 20mg of prednisolone a day for a week, then 15mg a day for a week, then 10mg a day for a week and 5mg a day for a week. The prednisolone works by entering cells that cause inflammation which blocks the body's inflammatory reaction [19]. I was told I was going to have more energy and want to eat more food; those both sounded great to me since I often had low mood due to the acne. My side effects were primarily trouble sleeping which was irritating since I usually need a minimum of nine hours of sleep.

How mood changes are related to the use of isotretinoin is unknown, but there is a clear correlation between negative changes in mood and patients taking vitamin A (like isotretinoin). One theory is that since vitamin A and its metabolites do cross the blood/brain barrier which can cause benign intracranial hypertension (raised fluid pressure around the brain), this causes a headache which could affect mood.

Another idea was that retinoic acid synthesised by the cell maintains neurogenesis and neuronal plasticity in the hippocampus (responsible for learning and memory which gets affected in psychiatric disorders) of the adult brain. Isotretinoin is a synthetic version of retinoic acid. On a study with mice, mice that had been treated with isotretinoin had defects in learning and memory with shrinkage of the hypothalamus (crucial for the body to maintain homeostasis) and diminished neurogenesis (development of new neurons) and therefore neuronal plasticity. This will most likely cause the depressive side effects of Roaccutane since the hypothalamus is responsible for regulating emotions. Decreases neurogenesis results in a smaller hippocampus volume which humans with depression have [20].

Finally, retinoic acid does affect the dopamine D2 receptors in the striatum (part of the basal ganglia involved in mainly motor control and also behaviour and emotion) in a way associated with depression and schizophrenia. These receptors are crucial to regulating activity of dopamine neurons and controlling the synthesis, release, and uptake of dopamine. Isotretinoin, once again, is a synthetic version of retinoic acid; this may be why mood changes occur when isotretinoin is taken [21].

Before I started Roaccutane, I had to get my bloods done to check liver function. I found that it causes liver abnormalities up to 15% of people due to an increase in Alanine Transaminase (ALT) and Aspartate Aminotransferase (AST) levels. After researching, I found that ALT and AST are enzymes which will increase in the blood when the liver cell membrane is damaged (since their function is to help the liver metabolise amino acids) which therefore is an indication of hepatocellular injury [22]. The liver is one of the most important organs since it removes waste products from the bloodstream, regulate blood sugar levels by storing glucose or metabolising glycogen and produces bile which is critical for digestion [23].

With all this in mind, Roaccutane was a guaranteed fix in my head. And of course, with time I feel confident my skin will improve, but I assumed it would be fixed immediately. I thought my face would be dry and peeling straight away. However, all I felt was a bit of dryness in my lips. After being on the medication for two weeks and feeling as though my skin had gotten worse, I begged my mother for another appointment so I could

increase my dosage (**Figure 7**). That is exactly what we did. My dosage was pushed up to 15mg per day and I had to restart the steroid steps (starting with 20mg a day for a week etc...) (**Figure 8**).

He emphasised the importance of not getting pregnant whilst on Roaccutane. This is because the baby would have serious defects since isotretinoin is a teratogen (agent that causes abnormalities following foetal during pregnancy). It has been shown that isotretinoin interferes with the development of cranial neural crest cells which are responsible for bone, cartilage, and connective tissue in the head [24]. I found that this results in babies with microtia (external ear is not formed properly), auricular duplication, anotia (no external ear), temporal bone abnormalities and ossicular malformation (prevents transmission of sound waves). I did not need to be prescribed birth control since I was already on it. But still, I was told if I got pregnant, the baby must be aborted. It is quite a lot for a 17-year-old to process.

He was vague what to do topically but that I should not be using any acids on my face, use a gentle cleanser and moisturiser. When I get acne flares, I use 0.025% Tretinoin Acid on the affected area which is basically topical Roaccutane (**Figure 9**).

In terms of side effects, I do have dryness in my lips and a nosebleed every now and then, but aside from that, nothing is really happening (**Figure 10**). Now I am waiting. Friends who have been on Roaccutane say that 3 months is the sweat spot, but they were on doses over 30mg. It does make me wonder if I am wasting time again. However, since Roaccutane is the last resort, I know patience is required.



Figure 1: Shows the right side of my face in October 2022 after being on antibiotics for 6 months. My skin was reasonable clear, but I just started developing some pimples on my cheeks which I had never experienced. I usually had blackheads and milia on my forehead. A month later.



Figure 2: Shows the right side of my face at the beginning of the academic year whilst being on doxycycline. The pimples have become notably more visible. A week later.



Figure 5: Shows my forehead whilst being on Yasmin and some left-over erythromycin.



Figure 3: Shows the right side of my face before trying my next treatment of Spironolactone. 2 months later.



Figure 6: Shows the left side of my face again on Yasmin and some left-over erythromycin. At the beginning of March 2023.



Figure 4: Shows the left side of my face whilst being of Yasmin only. Likewise.



Figure 7: Shows the left side of my face after being on Roacutane for 2 weeks. At this point most of my cheek was covered in acne. After upping my dosage.



Figure 8: Shows the right side of my face after being on Roaccutane for 3 weeks.



Figure 10: Shows the right side of my cheek after being on Roaccutane for 6 weeks. Once again, there is no improvement. If anything, my skin has gotten worse.



Figure 9: Shows the left side of my face after being on Roaccutane for 6 weeks. There was no improvement. Finally.

Conclusions

I have learnt to be more demanding and unapologetic about my treatment needs, take control of the situation, do my own research, and not let people waste my time. My reticence to push for a more aggressive treatment could have the consequence of permanent acne scars. It is difficult to remember this because each health care professional was so convincing at the time. From my journey (which is still ongoing), I feel as though

Roaccutane should be considered earlier in the treatment path. Although there are issues and known side effects of Roaccutane, I believe the numerous negative side effects of broad antibiotics, skin scarring, and mental health issues are not factored in sufficiently and need to be upweighted in the assessment. I say this, however, I am yet to see meaningful results from Roaccutane as I am relatively early in the treatment.

Acknowledgements

I am grateful for the supervision from Professor Justin Stebbing, who guided me through this process. He has helped me learn how to scientifically research, write and organise my work. His expertise and time have been vital to this paper.

References

1. Alison M. Layton. National Library of Medicine, PubMed Central: Oral Spironolactone for Acne vulgaris in Adult Females: A Hybrid Systematic Review. 2017.
2. Angela Palmer. Verywell Health, Skin Health, Acne: An Overview of Acne Vulgaris. 2023.
3. National Center for Biotechnology Information (2023). PubChem Compound Summary, Erythromycin. 2023.
4. Dr Trish Kahawita. HealthMatch: What Bacteria Causes Acne – And is it Contagious? 2022.
5. Karen Telvers. BMJ Open: Antibiotic-induced changes in the human gut microbiota for the most commonly prescribed antibiotics in primary care in the UK: a systematic review. 2020.
6. Hidaya Alioche. News Medical & Life Sciences: The Effect of Antibiotics on the Gut Microbiome. 2022.
7. Cynthia Cobb. Healthline: The Link Between Antibiotics and Yeast Infections. 2023.
8. James Q. Del Rosso. National Library of Medicine: Oral Doxycycline in the Management of Acne Vulgaris: Current Perspectives

-
- on Clinical Use and Recent findings with a New Double-scored Small Tablet Formulation. 2015.
9. Anita Rokoswka-Waluch. National Library of Medicine, PubMed Central: Stressful Events and Serum Concentration of Substance P in Acne Patients. 2016.
 10. Annelise Madison. National Library of Medicine, PubMed Central: Stress, depression, diet and the gut microbiota: human-bacteria interactions at the core of psychoneuroimmunology and nutrition. 2020.
 11. Anna Gora. LiveScience: Does gut health affect skin? 2022.
 12. NHS. Spironolactone, Common questions about spironolactone, how does spironolactone work? 2022.
 13. Dr Jeff Donovan. Donovan Hair Clinic: Irregular Periods from Spironolactone. 2016.
 14. Tasleem Arif. National Library of Medicine, PubMed Central: Salicylic acid as a peeling agent: a comprehensive review. 2015.
 15. NHS. Polycystic Ovary Syndrome, Overview. 2022.
 16. Dr Melanie Devis-Hall. The Lowdown: A Guid to Androgens. 2021.
 17. Natalie Healey. The Lowdown: What's the best contraceptive pill for acne? 2021.
 18. Alison Layton. National Library of Medicine, PubMed Central: The use of isotretinoin in acne. 2009.
 19. Healthdirect. Prednisolone: How does Prednisolone Work? 2020.
 20. M.J.D Goodfield. Oxford academic, BJD: Avic on the safe introduction and continued use of isotretinoin in acne in the UK. 2010.
 21. Christopher P. Ford. National Library of Medicine, PubMed Central: The Role of D2-Autoreceptors in regulating Dopamine Neuron Activity and Transmission. 2014.
 22. Jenny H.D.A van Beek. National Library of Medicine, PubMed Central: The Genetic Architecture of Liver Enzyme Levels: DDT, ALT and AST. 2013
 23. Columbia Surgery, Centre for Liver Disease and Transplantation: The Liver and Its Functions.
 24. Soon Min Lee. National Library of Medicine, PubMed Central: a Case of Suspected Isotretinoin-Induced malformation in a Baby of a Mother Who Became Pregnant One Month after Discontinuation of the Drug. 2009.