



Review Article

Dianabol Unveiled: A Systematic Review of Methandrostenolone

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Abstract

Methandrostenolone, commonly known as Dianabol or Dbol, is an anabolic steroid that gained immense popularity in the 20th century due to its potential to promote muscle growth and enhance athletic performance. Originally developed for medicinal purposes, it quickly found its way into the realms of bodybuilding and sports. This research article aims to provide an in-depth review of Methandrostenolone's pharmacology, mechanisms of action, performance-enhancing effects, potential side effects and overall health implications. We explore the scientific evidence surrounding its use, the risks associated with its misuse and the legal status of Methandrostenolone in various countries.

Keywords: Methandrostenolone; Dianabol, Dbol; Anabolic Steroids; Performance-Enhancing Drugs; Bodybuilding; Health Risks; Pharmacology; Athletic Performance

Introduction

Methandrostenolone, commonly known by its trade name Dianabol or Dbol, is an anabolic steroid that has left an indelible mark on the world of sports and bodybuilding. Developed in the 1950s by Dr. John Bosley Ziegler and the CIBA pharmaceutical company, Methandrostenolone was initially intended to address medical conditions related to muscle wasting and bone density deficiencies. However, its potent anabolic properties quickly attracted attention beyond medical circles [1,2].

The core objective of studying: Methandrostenolone usually revolves around understanding its effects, risks and benefits, especially in the context of its use in bodybuilding and athletic performance. Researchers might explore its impact on muscle mass, strength gains and overall performance. They may also investigate potential side effects, safety concerns and long-term health implications associated with its use.

Additionally, studies on Dianabol may aim to provide insights into optimal dosage, duration of use and potential interactions with other substances. This knowledge can be valuable for both medical professionals and individuals involved in fitness to make informed decisions about its usage [3-5].

Ultimately, the objective is to contribute to a comprehensive understanding of Dianabol's effects on the human body, allowing for informed decision-making and promoting health and safety in its use. The use of Methandrostenolone as a controller drug for essential medical purposes is not common. Dianabol is an anabolic steroid that is more commonly associated with performance enhancement in sports and bodybuilding rather than therapeutic use. Anabolic steroids like Dianabol can have serious side effects, including liver toxicity, cardiovascular issues and hormonal imbalances. While they may have legitimate medical uses in certain conditions, safer alternatives with fewer side effects are often preferred. In medical practice, other drugs are typically chosen for their efficacy and safety profiles. If there are specific medical conditions for which anabolic steroids are considered, it would be under strict medical supervision and in accordance with established guidelines.

It's crucial to note that the use of such substances without proper medical guidance can lead to adverse health effects. If you have concerns about a specific medical condition or treatment, it's always best to consult with a qualified healthcare professional for personalized advice.

Methandrostenolone exerts its effects by interacting with androgen receptors, stimulating protein synthesis and enhancing nitrogen retention in muscle tissues. These mechanisms contribute to an accelerated rate of muscle development and tissue repair, making it a sought-after compound among those seeking quick and noticeable gains.

Despite its potential benefits, the misuse and abuse of Methandrostenolone have raised concerns about its adverse effects on health. Liver toxicity, cardiovascular complications and hormonal imbalances are among the serious risks associated with its uncontrolled usage. Additionally, Methandrostenolone misuse can lead to psychological effects, including mood swings and aggressive behavior.

The legal status of Methandrostenolone varies from country to country, with many nations strictly regulating or outright banning its possession, distribution and use without a valid prescription.

This article aims to provide a comprehensive review of Methandrostenolone, discussing its pharmacology, mechanisms of action, performance-enhancing effects, potential side effects and overall health implications. By shedding light on the complex nature of this compound, we hope to promote a better understanding of its risks and benefits, leading to informed decisions about its use in the context of sports, fitness and medicine [6,7].

- *Pharmacology and Mechanisms of Action:* Methandrostenolone, a synthetic derivative of testosterone, belongs to the class of anabolic steroids known for their ability to promote muscle growth and enhance athletic performance. Understanding the pharmacology and mechanisms of action of Methandrostenolone is crucial for comprehending its effects on the body and its potential risk. It also has androgenic effects, which include the development of male secondary sexual characteristics. Androgenic effects can lead to the development of facial hair, deepening of the voice and other masculine features
- *Androgen Receptor Interaction:* Upon ingestion, Methandrostenolone is absorbed through the gastrointestinal tract and enters the bloodstream. It then binds to androgen receptors present in various tissues, including skeletal muscles. Once bound to these receptors, the steroid-receptor complex translocates into the cell nucleus, where it interacts with specific regions of DNA known as androgen response elements. This interaction activates gene expression, leading to the synthesis of proteins involved in muscle growth, such as actin and myosin
- *Increased Protein Synthesis:* Methandrostenolone, known for its ability to significantly increase protein synthesis in the body. Protein synthesis is a fundamental cellular process in which cells build new proteins from amino acids. Here's how Dianabol affects protein synthesis
- *Stimulation of Protein Synthesis:* Dianabol exerts its anabolic effects by increasing the rate of protein synthesis in muscle cells. This means that more proteins, including contractile proteins like myosin and actin, are produced by muscle cells. This is a key factor in the development and growth of muscle tissue
- *Improved Recovery:* Dianabol's ability to enhance protein synthesis also contributes to faster muscle recovery after intense workouts or resistance training. This can allow for more frequent and intensive training sessions, which can further promote muscle growth
- *Nitrogen Retention:* Methandrostenolone, commonly known as Dianabol, is an anabolic steroid that is known to significantly enhance nitrogen retention in the body. Nitrogen retention is a critical aspect of muscle growth and is one of the mechanisms through which anabolic steroids like Dianabol promote muscle development. Here's how Dianabol affects nitrogen retention:
- *Increased Nitrogen Balance:* Anabolic steroids like Dianabol increase the body's nitrogen balance. Nitrogen balance is a measure of the amount of nitrogen retained in the body compared to the amount excreted. Positive nitrogen balance indicates that more nitrogen is retained than excreted, which is a sign of anabolism (muscle growth)
- *Enhanced Protein Synthesis:* Dianabol promotes the synthesis of new proteins in muscle cells. Proteins are made up of amino acids and nitrogen is a fundamental component of amino acids. By increasing nitrogen retention, Dianabol supports higher rates of protein synthesis, which contributes to muscle tissue growth and repair
- *Anti-Catabolic Effect:* The positive nitrogen balance and increased protein synthesis also have an anti-catabolic effect. This means that Dianabol helps reduce the breakdown of muscle proteins. When the rate of protein synthesis exceeds the rate of

protein breakdown, muscle tissue is preserved or expanded

- *Muscle Recovery*: The enhanced nitrogen retention and increased protein synthesis provided by Dianabol can expedite muscle recovery after intense exercise or resistance training. This can allow for more frequent and intense workouts, potentially accelerating muscle growth
- *Glycogenolysis*: Dianabol (Methandrostenolone) is an anabolic steroid that is known to have an impact on various physiological processes, including glycogenolysis. Glycogenolysis is the breakdown of glycogen, which is a storage form of glucose found in the liver and muscles. Here's how Dianabol can affect glycogenolysis
- *Enhanced Glycogenolysis*: Anabolic steroids like Dianabol can enhance glycogenolysis in muscle tissue. This means that the drug can promote the breakdown of glycogen into glucose, which can be used as a source of energy during physical activity.
- *Increased Energy Availability*: By increasing glycogenolysis, Dianabol may lead to increased energy availability during exercise. This can potentially result in improved endurance and performance during intense physical activities
- *Effect on Muscular Strength*: The extra energy derived from glycogenolysis may contribute to improved muscular strength and the ability to lift heavier weights during resistance training, which is one reason why Dianabol has been used by some athletes and bodybuilders

It's important to note that the effects of Dianabol on glycogenolysis are just one facet of its overall mechanism of action. Dianabol primarily exerts its anabolic effects by increasing protein synthesis and nitrogen retention in muscle tissue, promoting muscle growth and recovery. However, the enhanced glycogenolysis contributes to the drug's potential to improve athletic performance and stamina [8-13].

- *Anti-Catabolic Effects*: Dianabol (Methandrostenolone) is believed to have some anti-catabolic effects, although its primary mechanism of action is focused on promoting anabolism, or the building of muscle tissue. Here's how Dianabol's anti-catabolic effects may work
- *Reduction of Muscle Protein Breakdown*: Dianabol can potentially reduce muscle protein breakdown, which is one of the key mechanisms of catabolism. By inhibiting the breakdown of existing muscle proteins, it can help preserve muscle tissue during periods of stress, such as intense training or caloric restriction
- *Maintenance of Nitrogen Balance*: Dianabol increases nitrogen retention in the body. Nitrogen is a fundamental component of amino acids, the building blocks of proteins. An increase in nitrogen balance means that more protein is retained in the muscles, which is an essential part of anti-catabolism
- *Preservation of Lean Body Mass*: The reduction in muscle protein breakdown and the maintenance of nitrogen balance can contribute to the preservation of lean body mass. This is particularly important during times when the body is under stress, as in cases of intense training or when calorie intake is restricted

It's important to note that while Dianabol is believed to have some anti-catabolic effects, it is primarily categorized as an anabolic steroid, meaning its primary purpose is to promote muscle growth and anabolism. The anti-catabolic effects are considered secondary and a result of the drug's anabolic properties [14].

- *Estrogenic Activity*: Methandrostenolone exhibits moderate estrogenic activity. This is because Dianabol is a derivative of testosterone and like many anabolic steroids, it can undergo aromatization, a process where it is converted into estrogen in the body. Here's how Dianabol's estrogenic activity works
- *Aromatization*: When Dianabol is metabolized in the body, a portion of it can be converted into estrogen, specifically estradiol, the most potent form of estrogen. This conversion occurs through the aromatase enzyme
- *Estrogenic Side Effects*: The presence of increased estrogen in the body can lead to estrogenic side effects. Common estrogenic side effects associated with Dianabol use may include water retention, gynecomastia (the development of male breast tissue) and increased blood pressure
- *Anti-Estrogens*: To counteract these estrogenic effects, some users of Dianabol may take anti-estrogen drugs such as Selective Estrogen Receptor Modulators (SERMs) like tamoxifen or Aromatase Inhibitors (AIs) like anastrozole. These medications can help control estrogen levels and mitigate the associated side effects

It's important to note that the degree of estrogenic activity and the risk of estrogenic side effects can vary among individuals [15].

- *Performance Enhancement:* Dianabol or Dbol, has gained notoriety for its potent performance-enhancing effects. It has been widely used by athletes, bodybuilders and fitness enthusiasts seeking to achieve rapid gains in muscle mass, strength and athletic performance. Below are some of the key performance-enhancing effects of Methandrostenolone
- *Increased Muscle Mass:* Methandrostenolone's anabolic properties stimulate protein synthesis and nitrogen retention, leading to a significant increase in muscle mass. Users often experience rapid gains in muscle size and fullness, particularly when combined with intense resistance training and a high-protein diet
- *Enhanced Strength:* By promoting protein synthesis and glycogenolysis, Methandrostenolone provides users with increased strength levels. This effect allows athletes to lift heavier weights and perform more repetitions during training sessions, leading to greater muscle stimulation and potential further muscle growth
- *Improved Endurance:* The enhanced glycogenolysis facilitated by Methandrostenolone results in an increased availability of glucose, the primary energy source for muscles. This allows athletes to sustain high-intensity workouts for longer durations, delaying the onset of fatigue and improving overall endurance
- *Quicker Recovery:* Methandrostenolone's anti-catabolic properties reduce muscle protein breakdown, which can expedite the recovery process after intense exercise. This enables athletes to train more frequently and recover faster between training sessions, potentially leading to greater progress over time
- *Boost in Confidence and Motivation:* Beyond its physiological effects, Methandrostenolone can have psychological impacts on users. The rapid gains in muscle mass and strength can boost an individual's confidence and motivation, encouraging them to train harder and achieve their fitness goals
- *Potential for "Kick-Starting" Steroid Cycles:* Methandrostenolone is sometimes used as a "kick-start" in steroid cycles due to its fast-acting nature. When combined with other injectable anabolic steroids with longer onset times, Methandrostenolone can provide initial gains during the first weeks of the cycle, while waiting for the full effects of the injectables to take effect

It is important to note that while Methandrostenolone can offer significant performance-enhancing benefits, its use comes with potential health risks and side effects. These may include liver toxicity, cardiovascular issues, hormonal imbalances and estrogen-related effects. Additionally, the gains achieved with Methandrostenolone are often associated with water retention, which may not be purely attributed to lean muscle mass [16-22].

- *Adverse Effects and Health Risks:* Methandrostenolone, like other anabolic steroids, is associated with a range of adverse effects and health risks, especially when used inappropriately or in high doses. The misuse and abuse of this compound can lead to serious and potentially life-threatening consequences. Some of the adverse effects and health risks associated with Methandrostenolone include:
 - *Liver Toxicity:* One of the most significant concerns with Methandrostenolone use is its hepatotoxicity, which means it can cause damage to the liver. Prolonged use or high doses of the steroid can lead to liver stress and in extreme cases, liver failure
 - *Cardiovascular Issues:* Methandrostenolone can adversely affect the cardiovascular system. It may lead to an increase in blood pressure, changes in cholesterol levels (decrease in HDL and increase in LDL) and an increased risk of heart-related problems
 - *Hormonal Imbalances:* As an exogenous hormone, Methandrostenolone can disrupt the body's natural hormone production. Prolonged use can suppress endogenous testosterone production, leading to hormonal imbalances, testicular atrophy and potential infertility
 - *Gynecomastia:* Methandrostenolone can cause gynecomastia, the development of breast tissue in males. This occurs due to the conversion of excess testosterone into estrogen, leading to an estrogen-to-androgen imbalance
 - *Water Retention:* The use of Methandrostenolone can cause water retention and bloating. While some of the initial gains in muscle mass are due to increased water retention, this can lead to a less-defined, "puffy" appearance
 - *Acne and Oily Skin:* Anabolic steroids can exacerbate acne and cause increased oil production in the skin
 - *Mood Swings and Aggression:* Methandrostenolone use may lead to mood swings, irritability and even aggressive behavior, often referred to as "roid rage"

Here's how Methandrostenolone can contribute to mood swings and aggression [23]:

- *Neurotransmitter Imbalance:* Anabolic steroids like Methandrostenolone can alter the balance of neurotransmitters in the brain, including serotonin and dopamine. These neurotransmitters play a crucial role in regulating mood and emotions. Disruptions in their levels can lead to mood swings and changes in emotional states
- *Hormonal Changes:* Methandrostenolone can interfere with the body's natural hormonal balance, including fluctuations in

testosterone and estrogen levels. Hormonal imbalances have been linked to changes in mood and behavior

- *Androgenic Effects:* As a derivative of testosterone, Methandrostenolone can exhibit androgenic effects, which may contribute to heightened aggression and irritability in some users
- *Psychological Impact:* The use of anabolic steroids, including Methandrostenolone, can have psychological effects, such as increased self-confidence and a sense of power. In some cases, this boost in confidence can lead to aggressive behavior, commonly known as "roid rage." It is essential to recognize that not all users will experience these effects, but it remains a concern for some individuals
- *Withdrawal Effects:* Abruptly stopping Methandrostenolone use after prolonged usage can lead to withdrawal symptoms, including mood swings, irritability and depression. These symptoms may be a result of the body's attempt to readjust to normal hormone levels
- *Interpersonal Conflicts:* Aggressive behavior and mood swings can strain personal relationships, leading to conflicts with family members, friends, or colleagues

It is important to note that not all individuals who use Methandrostenolone will experience mood swings and aggression and some may not notice any significant changes in mood or behavior. However, these psychological side effects are well-documented and have been reported in some users.

Hair Loss: Hair loss is a complex and multifactorial condition influenced by genetics, hormones and environmental factors. However, in individuals with a genetic predisposition to androgenic alopecia, Dianabol's androgenic properties can accelerate the onset and progression of hair loss.

DHT, a metabolite of testosterone, is a key culprit in androgenic alopecia. When Dianabol is introduced into the body, it can elevate testosterone levels, leading to an increase in DHT levels as well. Elevated DHT levels can lead to the miniaturization of hair follicles, resulting in shorter, thinner and weaker hairs. Over time, this process can lead to the shrinking of hair follicles to the point where they no longer produce visible hair, leading to male pattern baldness [22-27].

Responsible Use and Hair Loss Prevention: For individuals concerned about hair loss. Consider these measures to help minimize its impact.

Dosage and Cycle Length: Lowering the dosage and limiting the duration of Dianabol cycles may reduce the potential impact on hair follicles.

Hair Care: Regularly use gentle hair care products, avoid harsh treatments and refrain from pulling or tugging on the hair.

Hair Loss Treatments: Some individuals use hair loss treatments like minoxidil or finasteride to mitigate the effects of DHT on the hair follicles. However, it's crucial to consult with a healthcare professional before using these medications, as they may interact with other drugs.

Virilization in Women: Female users of Methandrostenolone may experience masculinizing effects, such as a deepened voice, facial hair growth and enlarged clitoris. These elevated androgen levels can cause various unwanted masculinizing effects, including [28-33]:

- *Deepening of the voice:* Women may notice a deepening of their voice, making it more masculine
- *Excessive body hair growth:* Anabolic steroids can stimulate the growth of coarse and dark body hair in areas typically more prevalent in males, such as the face, chest and back
- *Clitoral enlargement:* The clitoris can enlarge in response to increased androgen levels, leading to a more prominent appearance
- *Male-pattern baldness:* As mentioned earlier, androgenic steroids can lead to hair loss, including male-pattern baldness, in genetically susceptible women
- *Changes in body shape:* Androgenic steroids can alter body fat distribution, leading to a more masculine physique with increased muscle mass and reduced fat deposits in typical female areas
- *Menstrual irregularities:* Anabolic steroid use can disrupt the normal menstrual cycle, leading to irregular periods or even cessation of menstruation
- *Acne and oily skin:* Increased androgens can cause skin issues like acne and increased oil production

- *Dependency and Addiction:* Anabolic steroids, including Methandrostenolone, can be psychologically addictive, leading to dependency on the drug and difficulty discontinuing its use

However, it's essential to understand the differences between dependency and addiction.

Dependency: Dependency refers to the body's adaptation to the presence of the drug. With prolonged use of methandrostenolone, the body may become tolerant to its effects, requiring higher doses to achieve the same results. This can lead to physical dependence, where sudden cessation of the drug can result in withdrawal symptoms. These withdrawal symptoms can include mood swings, fatigue, reduced sex drive and other physical and psychological effects [33,34].

Addiction: Addiction involves a complex behavioral and psychological pattern where the individual experiences compulsive drug-seeking behavior despite negative consequences. People who are addicted to methandrostenolone or other anabolic steroids may prioritize drug use over other aspects of their lives, including relationships, work and health.

It's essential to recognize that not everyone who uses methandrostenolone or other anabolic steroids will develop dependency or addiction.

Skeletal System Impairment: Prolonged usage of Methandrostenolone can interfere with bone growth and development, especially in adolescents.

While anabolic steroids are known for their muscle-building properties, they can also negatively impact bones in the following ways:

- *Premature closure of growth plates:* The premature closure of growth plates in bones, is a concern associated with the use of anabolic steroids like Dianabol, particularly in adolescents and young adults who are still growing. Here's how this process works:
 - *Growth Plates:* Growth plates, also called epiphyseal plates, are areas of cartilage at the ends of long bones. These plates are responsible for bone growth in length. During puberty and adolescence, these plates are open and allow for continued growth until they naturally close when bone growth is complete
 - *Anabolic Steroids and Epiphyseal Closure:* Anabolic steroids can accelerate bone growth and maturation, leading to the premature closure of the growth plates. When the growth plates close prematurely, it can limit an individual's potential for further growth in height
 - *Adolescent Users at Risk:* Adolescents who use anabolic steroids are particularly vulnerable to this effect because they are still in a phase of active growth and development. Anabolic steroid use during this period can lead to irreversible height limitations

Osteoporosis: Long-term use of anabolic steroids can lead to a decrease in bone mineral density, making the bones more susceptible to fractures and increasing the risk of osteoporosis. Osteoporosis is a medical condition characterized by the weakening of bones, making them fragile and more prone to fractures. Here's how the use of Dianabol can impact bone health and increase the risk of osteoporosis:

- *Reduction in Bone Density:* Anabolic steroids like Dianabol can lead to reductions in bone mineral density. Over time, this can result in a decrease in the overall density and strength of bones
- *Weakening of Bone Quality:* Anabolic steroids can alter the quality of bone tissue. This can lead to brittle bones that are more susceptible to fractures
- *Increased Risk of Fractures:* Weakened bones are more likely to fracture even with minor trauma or impact. Individuals using Dianabol may be at higher risk for fractures, even without significant force
- *Long-Term Consequences:* Prolonged or high-dose use of anabolic steroids can have cumulative effects on bone health. The longer the use, the greater the potential impact on bone density and quality
- *Secondary Health Effects:* Osteoporosis is often associated with other health issues, including pain, disability and an increased risk of complications such as pneumonia and blood clots

To mitigate these risks, it's important to:

- **Prioritize Bone Health:** To maintain and improve bone health, individuals should engage in weight-bearing exercises, consume a diet rich in calcium and vitamin D and avoid behaviors such as smoking and excessive alcohol consumption that can negatively impact bone health

Tendon and ligament injuries: Anabolic steroids can increase muscle mass and strength, which may outpace the strength of the tendons and ligaments supporting the bones. This imbalance can lead to an increased risk of tendon and ligament injuries.

Avascular necrosis: Prolonged use of anabolic steroids has been associated with avascular necrosis, a condition where bone tissue dies due to a lack of blood supply. It commonly affects the hip joint and can lead to severe pain and joint dysfunction.

Joint pain: Some individuals using anabolic steroids may experience joint pain, which could be related to changes in joint structures or increased training intensity while on the drug.

Delayed fracture healing: Anabolic steroids can impair the normal process of bone healing after a fracture, leading to delayed recovery and potential complications.

It's essential to recognize that the severity of skeletal system impairment can vary based on factors such as the dosage and duration of anabolic steroid use, individual genetics and other lifestyle factors.

Here are some common legal consequences associated with Methandrostenolone:

Illegality: The legality of Dianabol (Methandrostenolone) varies by country and can change over time as laws and regulations are updated. Here are some general guidelines regarding the legality of Dianabol:

- **Prescription Medication:** In some countries, Dianabol is available by prescription for specific medical purposes, such as treating conditions involving muscle loss or hormonal imbalances
- **Controlled Substance:** Dianabol is classified as a controlled substance in many countries, meaning it is illegal to possess, use, buy, or sell it without a valid prescription. In these places, unauthorized possession or distribution of Dianabol is a criminal offense
- **Anti-Doping Regulations:** In the world of professional and amateur sports, the use of Dianabol and other anabolic steroids is strictly prohibited by anti-doping agencies and sports organizations. Violating anti-doping rules can result in disqualification, suspension, or other sanctions for athletes

Criminal Charges: The possession of Dianabol without a valid prescription can potentially lead to criminal charges in many jurisdictions. Here are some common legal consequences associated with the unauthorized possession of Dianabol [35]:

- **Drug Possession Charges:** The unauthorized possession of Dianabol may result in drug possession charges. These charges typically relate to the unlawful possession of a controlled substance. The specific classification of the drug and the severity of charges can depend on local drug schedules and laws
- **Misdemeanor or Felony Charges:** The classification of charges can vary. In some cases, Dianabol possession may lead to misdemeanor charges, while in others, it can result in felony charges, which tend to be more serious and carry more severe penalties
- **Legal Consequences for Distributors:** In addition to personal possession, the distribution or sale of Dianabol without a proper license can lead to more serious charges, potentially involving drug trafficking or distribution offenses, which often carry more severe penalties

Online purchase risks: Purchasing Dianabol or any anabolic steroid online carries a number of significant risks and is generally discouraged. Here are some of the risks and concerns associated with buying Dianabol online:

- **Counterfeit Products:** The online market for anabolic steroids is rife with counterfeit or fake products. You may receive a product that is not what it claims to be, which can be ineffective, unsafe, or even harmful
- **Quality and Purity:** Even if you receive a legitimate product, the quality and purity can vary significantly. Poorly

manufactured or contaminated Dianabol can pose serious health risks, including adverse reactions and infections

- *Scams and Fraud:* Online markets for anabolic steroids are susceptible to scams and fraud. You may pay for a product that is never delivered, or you might be subject to financial scams
- *Privacy and Security:* When you purchase Dianabol online, you may be exposing personal and financial information to unscrupulous sellers. There is a risk of identity theft and financial fraud
- *Ethical Concerns:* The use of anabolic steroids, particularly for non-medical purposes, raises ethical concerns. It can contribute to issues related to doping in sports and may have negative consequences for your reputation and integrity

International travel concerns: Carrying anabolic steroids across international borders can lead to serious legal issues, as different countries have varying laws and regulations regarding these substances.

Misuse and Abuse: Misuse and abuse of Methandrostenolone (Dianabol) refers to the improper or excessive use of the drug, often beyond its intended medical or therapeutic purposes. Misuse and abuse of this anabolic steroid can have serious health consequences. Here are some common ways in which Methandrostenolone may be misused and abused.

Non-Medical Use: Methandrostenolone is a prescription drug intended for specific medical conditions. However, some individuals may obtain it through illegal means, such as buying it from the black market or underground sources, to use it for bodybuilding or athletic performance enhancement.

- *High Dosages:* Misuse can involve taking Methandrostenolone at doses higher than recommended by healthcare professionals. Some users believe that higher doses will lead to more significant muscle gains and performance improvements, but this practice increases the risk of adverse effects
- *Prolonged Use:* Methandrostenolone is not meant for long-term use due to its potential side effects. However, some individuals may misuse the drug by using it for extended periods without appropriate medical supervision
- *Polypharmacy:* Some individuals may engage in "stacking," which involves combining multiple anabolic steroids and/or other performance-enhancing drugs in an attempt to enhance results. This polypharmacy approach significantly increases health risks
- *Cycling and Pyramiding:* Some users may misuse Methandrostenolone by employing cycling (periods of use followed by periods of abstinence) or pyramiding (gradually increasing and then decreasing the dose) to maximize effects. These practices can lead to unpredictable hormonal imbalances and adverse effects
- *Ignoring Adverse Effects:* Continuing to use Methandrostenolone despite experiencing adverse effects is a form of abuse. Some users may overlook or downplay the health risks associated with the drug
- *Ignoring Medical Advice:* Misusing Methandrostenolone can involve obtaining and using the drug without a valid prescription or ignoring medical advice regarding its proper use
- *Legal Status:* The legal status of Methandrostenolone in different countries is explored, shedding light on the varying regulations and penalties for its possession, distribution and use

The legal status of Methandrostenolone (Dianabol) varies from country to country. It's important to note that laws and regulations related to anabolic steroids can change over time, so it's essential to check with local authorities or legal sources for the most up-to-date information. In many countries, Methandrostenolone is classified as a controlled substance, which means it is illegal to possess, use, buy, or sell without a valid prescription from a licensed medical professional. Methandrostenolone, has the potential to interact with various substances, medications and health conditions. It's crucial to be aware of these interactions to ensure your safety and to prevent adverse effects. Here are some key interactions related to Dianabol [36].

Other Anabolic Steroids: Combining Dianabol with other anabolic steroids can increase the risk of adverse effects, such as cardiovascular issues, liver damage and psychological changes. It's generally not recommended to use multiple anabolic steroids simultaneously.

Alcohol: Both Dianabol and alcohol can be taxing on the liver. Combining them can increase the risk of liver damage. It's advisable to avoid alcohol while using Dianabol.

Hepatotoxic Medications: Dianabol (Methandrostenolone) is known to be hepatotoxic, which means it can have adverse effects on the liver. When used in combination with other hepatotoxic medications or substances, the risk of liver damage can increase significantly. Interactions with hepatotoxic medications should be approached with extreme caution and it is advisable to consult a healthcare provider for guidance. Here are some points to consider [37]:

- *Synergistic Liver Toxicity:* Combining Dianabol with other hepatotoxic medications or substances, such as some pain relievers, certain antibiotics, or alcohol, can potentially lead to synergistic liver toxicity. This means that the combined effects on the liver may be more harmful than using any one of these substances alone
- *Increased Risk of Liver Damage:* The liver plays a crucial role in metabolizing drugs and toxins. When the liver is exposed to multiple hepatotoxic agents, it can become overwhelmed, leading to liver damage. Dianabol, in itself, is already demanding on the liver
- *Monitoring and Dose Adjustment:* If it is deemed necessary to use Dianabol in combination with hepatotoxic medications, close monitoring of liver function is essential. Dosage adjustments for both Dianabol and the other medications may be required
- *Consider Alternatives:* In some cases, it might be advisable to consider alternatives to Dianabol if its use in combination with other medications poses a significant risk to your liver health. A healthcare provider can help explore safer alternatives for achieving your health or fitness goals

Blood Thinners (Anticoagulants): Interactions between Dianabol (Methandrostenolone) and anticoagulants (blood thinners) can be a matter of concern because Dianabol has the potential to affect blood clotting and may increase the risk of bleeding when used in combination with anticoagulant medications. Here are some key points to consider:

- *Enhanced Anticoagulant Effects:* Dianabol may enhance the anticoagulant effects of medications like warfarin or other blood-thinning drugs. This means that it can further reduce the ability of blood to clot, potentially leading to a higher risk of bleeding
- *Increased Bleeding Risk:* The combination of Dianabol with anticoagulants can lead to an increased risk of bleeding from minor injuries or cuts, as well as a potential risk of internal bleeding
- *Regular Monitoring:* If there is a medical reason to use both Dianabol and anticoagulants simultaneously, close monitoring of blood clotting parameters is essential. Your healthcare provider should regularly check your International Normalized Ratio (INR) or Prothrombin Time (PT) to ensure that your blood is not excessively thin
- *Dose Adjustments:* Dose adjustments for anticoagulant medications may be necessary when taken in combination with Dianabol. Your healthcare provider will determine the appropriate dosage to maintain your target level of anticoagulation.
- *Consider Alternatives:* In some cases, it might be advisable to consider alternatives to Dianabol if its use in combination with anticoagulant medications poses significant risks. A healthcare provider can help explore safer alternatives for achieving your health or fitness goals

Insulin and Antidiabetic Medications: Interactions between Dianabol (Methandrostenolone) and insulin or antidiabetic medications can have important implications for individuals with diabetes or those taking medications to manage blood sugar levels. It's essential to be aware of these potential interactions and to seek guidance from a healthcare provider when considering the use of Dianabol. Here are some key points to consider:

- *Blood Sugar Levels:* Dianabol has the potential to affect blood sugar levels. It can cause insulin resistance, which means that the body's cells become less responsive to insulin. This can lead to elevated blood sugar levels
- *Interaction with Insulin:* If you are using insulin to manage your blood sugar, the combination of Dianabol can make it more challenging to control your blood sugar effectively. You may require higher doses of insulin, which should only be done under the guidance of a healthcare provider
- *Antidiabetic Medications:* If you are taking oral antidiabetic medications, the interaction between Dianabol and these drugs can also affect blood sugar control. You may need dose adjustments or different medications to maintain appropriate blood sugar levels
- *Monitoring:* It is essential to monitor your blood sugar levels regularly when using Dianabol in combination with insulin or antidiabetic medications. Frequent blood glucose monitoring helps ensure that your blood sugar is adequately controlled and adjustments can be made as necessary
- *Consider Alternatives:* In some cases, it might be advisable to consider alternatives to Dianabol if its use poses significant risks to blood sugar control. A healthcare provider can help explore safer alternatives for achieving your health or fitness goals

Corticosteroids: Interactions between Dianabol (Methandrostenolone) and corticosteroids are an important consideration due to the potential for additive effects on various body systems. It's crucial to be aware of these interactions and seek guidance from a healthcare provider when considering the use of Dianabol in combination with corticosteroid medications. Here are some key points to consider:

- **Corticosteroids and Muscle Wasting:** Corticosteroids, such as prednisone, are often prescribed to reduce inflammation and manage various conditions, but they can have side effects, including muscle wasting and weakening. Dianabol is an anabolic steroid designed to build muscle. If used together, Dianabol might be intended to counteract the muscle-wasting effects of corticosteroids
- **Adrenal Suppression:** Both corticosteroids and anabolic steroids, like Dianabol, can potentially suppress the body's natural production of corticosteroids by the adrenal glands. This can lead to a risk of adrenal insufficiency when these drugs are used simultaneously
- **Bone Health:** Corticosteroids can weaken bones and increase the risk of osteoporosis. Dianabol, as an anabolic steroid, can also affect bone health. Combining them may exacerbate these effects and increase the risk of fractures and bone-related issues
- **Blood Sugar Levels:** Corticosteroids can elevate blood sugar levels, potentially leading to or exacerbating diabetes. The interaction between Dianabol and corticosteroids may affect blood sugar control
- **Immunosuppression:** Corticosteroids can suppress the immune system, making it easier to get infections. While Dianabol is not an immunosuppressant, the combination might increase the overall risk of infections
- **Consider Alternatives:** Depending on the underlying medical condition and the need for corticosteroid treatment, it might be advisable to consider alternative treatments or therapeutic approaches that minimize the risks associated with anabolic steroids like Dianabol

Prostate Issues: Dianabol (Methandrostenolone) can potentially exacerbate prostate issues, especially in individuals who are already at risk or have pre-existing prostate conditions. Here's why this is a concern:

- **Prostate Enlargement:** One of the potential side effects of anabolic steroid use, including Dianabol, is the promotion of Benign Prostatic Hyperplasia (BPH), which is the non-cancerous enlargement of the prostate gland. BPH can lead to urinary problems, such as frequent urination, weak urine flow and difficulty emptying the bladder
- **Aggravation of Prostate Cancer:** If an individual has prostate cancer, the use of anabolic steroids like Dianabol can potentially accelerate the growth and progression of the cancer. This is due to the androgenic effects of these steroids, which can stimulate the growth of prostate cancer cells
- **Hormonal Changes:** Dianabol can affect the body's hormonal balance, particularly by increasing levels of testosterone. Elevated levels of testosterone can be associated with prostate issues, including BPH and the development or progression of prostate cancer
- **Consult a Healthcare Provider:** If you have a history of prostate issues, such as BPH or prostate cancer, it is crucial to consult with a healthcare provider before considering the use of Dianabol or any anabolic steroid. They can assess your specific situation, evaluate the potential risks and provide guidance on the use of these substances
- **Regular Medical Monitoring:** If you are using Dianabol and have prostate issues or are at risk, your healthcare provider may recommend regular monitoring, such as Prostate-Specific Antigen (PSA) tests, to assess any changes in your prostate health

Cardiovascular Medications: Interactions between Methandrostenolone and cardiovascular medications are a matter of concern because Dianabol use can affect cardiovascular health, potentially interacting with the effects and safety of cardiovascular medications. Here are some important considerations [31,34]:

- **Blood Pressure Effects:** Dianabol can lead to an increase in blood pressure due to its potential to cause fluid retention and other mechanisms. This increase in blood pressure can be harmful for individuals with cardiovascular conditions, such as hypertension (high blood pressure). If you're taking antihypertensive medications to control your blood pressure, the combination of Dianabol and these medications can complicate blood pressure management
- **Cardiovascular Risks:** Dianabol can also have adverse effects on cardiovascular health, such as promoting unfavorable changes in lipid profiles, including increased Low-Density Lipoprotein (LDL) cholesterol and reduced High-Density Lipoprotein (HDL) cholesterol. This can contribute to the development or progression of atherosclerosis and cardiovascular disease. If you're taking cardiovascular medications, such as statins, for lipid control, the use of Dianabol can undermine their

effectiveness

- *Heart Health:* Anabolic steroids like Dianabol can affect heart health and may increase the risk of heart-related issues. If you are prescribed medications for heart conditions, such as beta-blockers or medications to control arrhythmias, the interaction with Dianabol can complicate the management of these conditions
- *Blood Clotting:* Dianabol has the potential to affect blood clotting due to its effects on platelet aggregation. If you are prescribed medications to prevent blood clots, such as antiplatelet drugs or anticoagulants, the interaction with Dianabol may affect their effectiveness
- *Consider Alternatives:* Depending on your underlying cardiovascular condition and the need for cardiovascular medications, it might be advisable to consider alternative treatments or therapeutic approaches that minimize the risks associated with anabolic steroids like Dianabol

Pregnancy and Breastfeeding: Dianabol (Methandrostenolone) is a powerful anabolic steroid and its use during pregnancy and breastfeeding is not recommended. Here are some key points regarding Dianabol interactions with pregnancy and breastfeeding.

Pregnancy:

- *Fetal Development:* Anabolic steroids like Dianabol can have virilizing effects, which means they may induce male-like characteristics in the developing fetus if used during pregnancy. These effects can include genital abnormalities in female fetuses
- *Hormonal Disruption:* Dianabol can disrupt the hormonal balance and the use of such steroids during pregnancy can negatively affect maternal and fetal health
- *Risk to the Mother:* The use of Dianabol during pregnancy can have potential risks for the mother's health, including liver strain and other adverse effects. These risks can indirectly affect the developing fetus

Breastfeeding:

- *Transfer to Breast Milk:* Anabolic steroids like Dianabol can be excreted into breast milk. This can expose a nursing infant to the drug's effects, including hormonal disruption and potential health risks
- *Unknown Long-Term Effects:* The long-term effects of exposure to anabolic steroids through breast milk are not well understood and it is safer to avoid these substances while breastfeeding
- *Breast Health:* The use of Dianabol can have potential side effects on breast health, which may affect breastfeeding

It is advisable to discontinue the use of Dianabol and other anabolic steroids while pregnant or breastfeeding.

Psychological Health: Dianabol (Methandrostenolone) is known for its potential to affect psychological health. Here are some key points related to Dianabol and psychological health:

- *Mood Changes:* Anabolic steroids like Dianabol can lead to mood swings and changes in emotional well-being. Some users report increased aggression, irritability and even feelings of anger or hostility. These mood changes are commonly referred to as "roid rage"
- *Psychological Dependence:* The use of Dianabol can lead to psychological dependence, as some individuals may become psychologically reliant on the effects of the drug, especially if it enhances their self-esteem, body image, or athletic performance
- *Psychiatric Disorders:* Prolonged or high-dose use of anabolic steroids may increase the risk of developing or exacerbating psychiatric disorders, such as anxiety and depression
- *Hormonal Imbalance:* Anabolic steroids can disrupt the body's natural hormonal balance, leading to changes in mood and behavior
- *Individual Variability:* Responses to Dianabol can vary widely among individuals. While some people may experience significant psychological changes, others may not be as affected
- *Post-Cycle Depression:* After discontinuing Dianabol use, some individuals may experience a "crash" period characterized by mood swings, depression and a sense of loss. This is often associated with the abrupt cessation of the drug
- *Psychological Counseling:* For individuals experiencing significant psychological effects while using Dianabol, psychological

counseling and support may be beneficial. It is important to address any mental health concerns promptly

Conclusion

Methandrostenolone remains a controversial compound due to its potent performance-enhancing effects and potential health risks. Is a potent anabolic steroid that has been widely used in the bodybuilding community for decades. Its ability to promote muscle mass and strength gains has made it popular among athletes and fitness enthusiasts. However, it is essential to approach Dianabol with caution and awareness of its potential risks and side effects. While Dianabol can yield impressive results in terms of muscle growth, it also comes with a range of adverse effects, including liver toxicity, cardiovascular issues, hormonal imbalances, and, notably, the potential for hair loss. The connection between Dianabol and hair loss is primarily attributed to its androgenic properties, which can lead to an increase in DHT levels, a key factor in androgenic alopecia.

Individuals with a genetic predisposition to male pattern baldness are at a higher risk of experiencing hair loss while using Dianabol. Additionally, understanding one's own health profile, including any preexisting conditions, is vital before considering the use of Dianabol or any anabolic steroid. As with any performance-enhancing substance, it is essential to prioritize health and safety above all else. The pursuit of a sculpted physique should never come at the expense of long-term well-being. Alternatives to Dianabol, such as natural supplements and proper nutrition, can offer satisfactory results while avoiding the potential risks associated with anabolic steroids. In the world of bodybuilding and fitness, it is essential to remember that building a strong and healthy body is a journey that requires dedication, hard work and patience. Ultimately, sustainable progress is achieved through a well-balanced approach that focuses on proper training, nutrition and recovery, rather than relying solely on the use of performance-enhancing drugs.

Conflict of Interest

The author has no conflict of interest to declare.

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